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# THE HOME AND SCHOOL REFERENCE WORK


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VOLUME IV


THE HOME AND SCHOOL EDUCATION SOCIETY

CHICAGO, NEW YORK, BOSTON, DETROIT, KANSAS CITY, SAN FRANCISCO
WINDSOR, ONT., WINNIPEG

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PRESS OF THE
BLAKELY-OSWALD PRINTING CO.
CHICAGO

**Liège,** *Le azhe',* capital of the Belgian province of the same name. It is situated on both banks of the Meuse at its confluence with the Ourthe, and in a region abounding in mineral wealth. The Meuse divides the city into two parts, the old town on the left bank, which contains the principal public buildings, and the new town on the right, the manufacturing center. Six main bridges span the river, and the city has waterworks, electric lighting, boulevards and good street-car service. Among several fine churches is the Cathedral of St. Paul, founded in 968. Other features of interest are the Palace of Justice, a handsome modern theater, the university buildings, the municipal museum and the zoological and botanical gardens. Liège manufactures guns and cannon, heavy machinery, watches, gold and silver articles, cloth, leather and paper.

Liège dates from about 558. In 1702 it fell before Marlborough. In 1801 it was ceded to France, was annexed to United Netherlands by the Congress of Vienna (1815), and in 1830 became a part of Belgium. Liège has had a strongly fortified position since 1888, when its twelve great forts were erected, six on each bank of the Meuse. In the European War of 1914 the city was captured by the German troops on their march through Belgium. Population in 1910, 174,268.

**Lien,** *Le' en,* a claim or hold which one person has on the property of another as a security for debt. In the United States liens are of two kinds, specific and general. A specific lien is one over specific goods for a debt contracted in respect to them alone. General liens do not exist at common law but depend upon agreement, and the person in possession may detain the goods, not only for his claim accruing from them, but also for the general balance of account with the owner. Statutory liens are acquired by filing a notice in the proper office for similar records, usually the office of the county clerk, and they are enforced by judicial proceedings corresponding to foreclosure.

**Lieutenant,** *Lu ten' ant,* an officer in the army and navy. In the army, lieutenants rank next below captains, the first lieutenant corresponding to master in the navy and the second lieutenant to ensign. In the navy, lieutenants correspond to captains in the army. See NAVY; COMMANDER; ENSIGN; ARMY.

**Lifeboat.** See LIFE-SAVING SERVICE.

**Life Preserver,** usually a form of belt designed to buoy up in water the person wearing it. It generally consists of sections of cork, sewed in a canvas covering, and is buckled around the waist, canvas straps being provided to go over the shoulders. There are life preservers made in the form of jackets, trousers and suits of rubber, which are made double and inflated with air. Mattresses stuffed with cork are sometimes used.

**Life-Saving Service,** a service maintained to lessen loss of life at sea. The life-saving system of the United States was organized in 1871. It now has about 300 stations located at points of danger on the coasts of the Atlantic, Pacific and Great Lakes. The station buildings are built to withstand severe winds and storms and tides. They are divided into suitable apartments, arranged for the accommodation of the crews and the storage of the life-saving appliances.

Usually a crew consists of a keeper and about eight men, who are selected for this work. They are required to be over 18 and under 40 years of age, and to be citizens of the United States. The keeper has full charge of the building and the control of the crew, whom he rules with rigid discipline, and from whom he requires frequent drills in handling the various apparatus and in methods of resuscitating the apparent drowned. When a shipwreck occurs, lifeboats, which are so constructed that they cannot sink, are sent to the points of danger, carrying life preservers and other appliances that may become useful. It requires from five to eight men to handle the lifeboat, but when it cannot be used, life lines are thrown to the stranded vessel by a small cannon, which shoots a ball carrying a light line. To

the shore end of this line a life line is attached, and when this has been hauled aboard and attached to the ship, a life buoy, or breeches buoy, can be sent over it to bring those on the ship to shore one by one.

The breeches buoy is a circular life preserver of cork, from which are suspended short canvas breeches. It holds one person, and is so arranged as to run along a line from the ship to the shore. Other appliances belonging to the station are boat wagons for hauling the lifeboats along the beach, roller boat skids, carts for loading apparatus, heaving sticks, cork jackets, signal flags, night warning signals, beach torches, patrol lanterns, hawsers, hauling lines, medicine chests with surgical instruments, bandages, etc. Gold and silver medals are awarded to those members of the crew who display unusual heroism.

The cost of maintaining this service is nearly $2,000,000 annually, and the amount of property saved frequently reaches the sum of $12,000,000, with many thousands of persons rescued.

Foreign Life-Saving Service. England, France, Germany, Russia, Austria, Belgium, Denmark, Holland, Italy and Spain all maintain a life-saving service, differing but little from that of the United States.

**Lig'ament,** in anatomy, a strong, tough, flexible membranous expansion of fibrous tissue, which binds the ends of the bones together and helps to control and limit the movements of the joints. Ligaments also serve to strengthen attachments between other parts of the body. They are of three kinds: those shaped like heavy cords, those in the form of flattened bands of various widths and lengths, and those in the form of a bag, such as the capsular ligament, which encloses certain kinds of joints. Ligaments differ from tendons in being of a stouter structure; they hold the bones of the skeleton together, whereas tendons serve to unite muscle with bone. They are inelastic, and dislocation of a joint often causes them to break, inflicting permanent injury. See Tendon.

**Light,** commonly, the sensation perceived by the eye; more technically, the wave motion which is able to produce this sensation. The wave theory of light assumes that all space is pervaded by a medium known as the luminiferous ether; certain bodies like the sun, a live coal, etc., have the power to set in motion, in this ether, waves of a certain rapidity of vibration, and this phenomenon is known as light. Bodies which are able to set these waves in motion are known as luminous bodies. The difference between heat and light is only a difference in wave-length, since those vibrations whose wave-length is greater than that of red or less than that of violet light are incapable of affecting the average eye, the former producing heat and the latter causing chemical changes. Bodies which reflect light but do not produce it are said to be nonluminous; those which transmit light clearly are transparent; those which transmit light, but not clearly enough to reveal through them the objects from which it comes, are transculent; those which effectually cut off the passage of light are opaque. A single line of light is known as a ray and a collection of rays is called a pencil, or sometimes a beam.

Velocity of Light. The velocity of light was first computed by the Danish astronomer Römer in 1675, from observations of the eclipses of Jupiter's largest moon. Recent determinations by other methods practically verify Römer's figures and show that light travels with a speed of 186,320 m. per second in a vacuum, or 186,270 m. per second in air. At this speed a train would go around the earth, at the equator, seven and one-half times in a second. For all practical purposes and for distances upon the earth the transmission of light is instantaneous.

Rectilinear Propagation of Light. From every point of a luminous body light is given off equally in all directions; thus a strong light that can be seen at night from a certain distance in one direction can also be seen from that distance in any other direction if

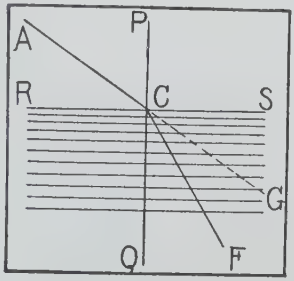
LIGHT

no objects intervene. In a uniform medium, like air, light travels in straight lines; this is evident from the fact that we cannot see around obstructions nor through bent tubes. If a small hole, about half an inch across, be made in the window of a well-darkened room, the rays of light coming from various objects outside pass through the hole and form an inverted image of the outside objects on the opposite wall of the room, or on a screen held a few feet from the hole. A small pencil of light from each outside point passes through the hole and illuminates just one small spot on the screen, and thus the entire image is built up.

INTENSITY. The intensity of a light varies inversely as the square of the distance from its source. At two miles from the luminous object the intensity is one-fourth as great as at one mile.

REFLECTION OF LIGHT. Light is reflected, when, upon striking a surface, it is turned back into the medium through which it was transmitted. It is by means of these reflected rays that objects become visible. On an ordinary rough surface these rays are greatly diffused and such objects are more plainly seen than objects having polished surfaces. When a ray of light falls upon a surface, the angle which it makes with a perpendicular to the surface at the same point is called the angle of incidence; the angle made by the reflected ray with the same perpendicular is known as the angle of reflection. The law of reflection of light states that the perpendicular, the original ray and the reflected ray lie in the same plane and that the angle of incidence and the angle of reflection are equal.

REFRACTION OF LIGHT. Refraction is the bending of rays of light on passing from one medium into another. If a straight pole be held partly under water and somewhat inclined, it will appear bent where it enters the water. The rays of light coming from the submerged part of the pole are bent or *refracted* as they pass from the water into the air; hence we see the submerged part of the pole apparently in a position different from its true position. In the illustration, R S indicates the surface of the water and P Q the perpendicular. A ray of light starting from F in the bottom of the stream is refracted at C and reaches the eye at A. The eye follows the ray back in a straight line and the point F appears to be at G.



REFRACTION

*Prism.* For studying the refractive properties of a substance, it is usually made into the form of a trigangular prism with its polished plane surfaces or faces making an angle of from 30° to 60° with each other. If a narrow beam of sunlight be directed upon one face of such a glass prism (preferably in a darkened room), as shown in the diagram, it will be refracted as it passes into the prism at the one face and again as it passes out of the prism at the other face. It will be noticed that the beam of light is both deviated by the prism and spread out into a band of color called a spectrum, the red being deviated least and the violet most, with the other colors between, as can readily be seen by letting the deviated beam fall on a white screen. This separation of white light into a spectrum is called *dispersion,* and is due to the fact that lights of different colors are refracted by different amounts on passing from one medium into another.

*Refractive Index.* Refraction of light on passing from one medium into another takes place because the velocity of light is different in different substances, and dispersion occurs because the velocities for the different colors are different in the same medium. The quotient of the velocity of light in a vacuum (or practically in air) divided by its velocity in the substance is called the *refrac-*

*tive index* of that substance for light of the particular color used; and the difference of the refractive indices for violet and red is a measure of the *dispersive power* of that substance. For example, the refractive indices for crown and flint glass are 1.534 and 1.587, respectively, for yellow light; for red they are 1.528 and 1.578; and for violet they are 1.551 and 1.614, respectively. The dispersive powers are accordingly 1.551—1.528, or .023, for crown glass; and 1.614—1.578, or .036, for flint glass. The study and manufacture of various glasses having different refractive and dispersive powers are of fundamental importance to the makers of photographic and other lenses, and of prisms and other glass parts of spectroscopic apparatus.

Nature of Light. Many theories concerning the nature of light have been held from time to time. Newton held that light consisted of minute particles or corpuscles sent out from luminous bodies with enormous speed, and that the sensation of light was caused by these particles hitting the eye. On this notion he explained the rectilinear propagation of light, reflection and refraction. Huygens (1629-1695) held that light was some form of wave motion different from sound, and adduced many reasons for his theory. On this notion were explained all the phenomena accounted for on the corpuscular theory, and in addition, polarization, interference and diffraction of light (See Polarization of Light; Diffraction). It is due to interference of light reflected from the outside and the inside surfaces of a soap bubble that the beautiful colors are seen, especially when the film becomes very thin.

The generally accepted theory at present is that light consists of so-called electromagnetic waves in the ether, since all the fundamental experiments performed with light waves have been repeated with electromagnetic waves of relatively large wave-lengths of from 400 meters to perhaps 50 meters. Similar waves have been produced in the laboratory having wave-lengths as short as .6 centimeter. The longest heat waves so far detected have a length of .006 centimeter; the longest waves ordinarily visible as deep red have a length of .000076 centimeter, and the shortest, .000039 centimeter; ultra-violet waves as short as .00001 centimeter have been detected, especially by their chemical effects. All these various waves are transmitted through the air with practically the same speed of about 300,000 kilometers per second. Hence from the general relation that speed equals the product of wave-lengths by frequency of vibration, it is seen that the longer the wave-length the lower is the frequency of vibration. When the frequency is between the limits of 400 million million and 750 million million vibrations per second, these ether waves are called light. A very excellent discussion of the subject in popular language can be found in *Light,* by Richard C. Maclaurin, published by the Columbia University Press, New York.

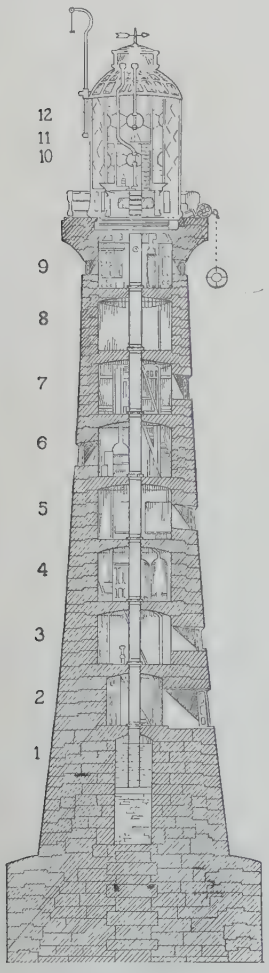
**Lighthall, William Douw** (1857- ), Canadian lawyer and writer, born in Hamilton, Ontario. He graduated at McGill University, Montreal, in 1879, and, after completing a course in law, engaged in practicing his profession in Montreal. Mr. Lighthall has become a prominent figure in Canadian life, socially, politically and in historical and literary circles, and has been called "a living example of good citizenship." A man of wide culture, refined taste and literary ability, he is the author, among other writings, of *Montreal After 250 Years, A Link in Iroquois History, Canada a Modern Nation* and *The Governance of Empire.* He also edited *Songs of the Great Dominion* and *Canadian Poems and Lays.*

**Lighthouse,** an elevated structure, usually in the form of a tower, bearing on the top a light to guide mariners at night. Lighthouses serve two purposes, to guide mariners into the entrance of harbors and to warn them of approach to places of danger.

Construction. On shore, lighthouses are usually located on bluffs or prominent points of land from which the light

LIGHTHOUSE

can be seen at a great distance. But many lighthouses are located on rocks far from shore. The construction of a lighthouse, therefore, depends upon its location, and the particular purpose for which it is erected. Lighthouses on shore do not have to resist the force of waves, tides or ice, and their construction is much more simple than that of those in the open sea. Sometimes the lighthouse consists of only a wooden frame, upon which the lantern is mounted. In other places, brick, stone or steel towers are erected. Whenever the location is such that the keeper must live near his light, a house is built for his family.




LIGHTHOUSE

1, Water tank; 2, entrance room; 3, storeroom; 4 and 5, oil rooms; 6, living room; 7 bedroom; 8, storeroom; 9, service room; 10-12, light chamber and light.

The erection of lighthouses on nearly inaccessible rocks in the open sea often presents the most difficult of engineering problems. Often the foundation must be laid under water, and before this can be done the rock must be leveled. Upon this foundation is reared the tower, which is usually in the form of a truncated cone. Sloping gently towards the top, these structures have to resist the pressure of wind and sometimes of ice. They must, therefore, possess great strength. The walls are of stone or concrete, and at the base are five or six feet thick, tapering upward until at the top the thickness is about 18 inches. The stones are doweled and cemented together, so as to form one solid mass. Inside, the walls are lined with brick, and an air space is left between the wall and the lining. The interior is divided into several rooms, which serve as storerooms for supplies and living rooms for the keeper and his family. The top is surmounted by the light chamber in which the lantern is placed.

THE LIGHT. The light is the most important part of the structure. Many lights at entrances to harbors and on points on shore consist of a large lamp within a glass-enclosed chamber. When designed to throw light in only one direction, a strong concave reflector is placed back of the light. The most important lights, however, are of the revolving type. The light consists of a lamp containing several circular wicks, one within the other, so as to produce a solid frame. Surrounding the lamp is the lantern, which consists of three or more series of lenses, each series constituting a face. The series consists of a plano-convex lens (See LENS), which is placed in the center, and surrounded by a number of rings of prisms, so constructed that they reflect all rays of light striking them in parallel lines. The several series of lenses are mounted in a brass frame, which is supported on brass rollers, revolving on a horizontal, metallic plate. The motion is imparted to the apparatus by clockwork. The lantern may have from three to six faces. The largest patterns contain several thousand pieces of glass, and the light from the largest can be seen for more than 20 m. A beam of light from a revolving lantern can be seen only when the face of the lantern is directly opposite the observer; consequently all revolving lights are known as flash lights. In a single revolution, the light produces as many flashes as the lantern has faces.

A red light is produced by placing a pane of red glass in front of the face. The number of flashes, exact time of revolution to a second and the relative number of red and white flashes are all recorded, and a copy of this record is placed with every mariner navigating the waters on which the light is located.

Lightship. Sunken rocks occasionally occur in the paths of vessels where lighthouses cannot be constructed. These places are marked by lightships which are anchored to the rock. A lightship contains two masts, on each of which a light is supported at night. The living rooms for the keeper are in the hold of the vessel, which is staunch and strong to withstand the action of the waves.

Lighthouse Board. All lighthouses in the United States are under the management of the lighthouse board, which constitutes a bureau in the United States Department of Commerce. This board makes all rules for governing lighthouses and buoys, and has control over the entrances to all harbors. It purchases all supplies for the service, and maintains on the Atlantic and Pacific coasts and on the Great Lakes fleets of boats called "lighthouse tenders." These boats visit the lighthouses at frequent intervals, and take to them the necessary supplies. The entire lighthouse service is under rigid discipline, and is subject to frequent government inspection. The keeper is required to stay by his light, even if in so doing he forfeits his life. All maritime nations now maintain lighthouse systems, which have reached a high degree of perfection.

**Lightning,** a sudden illumination of the heavens, due to the discharge of atmospheric electricity from one cloud to another or from a cloud to the earth. There are three principal classes of lightning: (1) forked, or zigzag lightning, a line of light of intense brilliancy and irregular direction, which sometimes ramifies in branches like the limbs of a tree; (2) sheet lightning, which is without definite form and which usually appears at a considerable distance on the horizon; and (3) the so-called ball lightning, which has the appearance of a small globe of brilliant light moving along near the surface of the ground, and which generally breaks up with an explosion.

Both the earth and the air are highly charged with electricity, but the electricity of the earth and that of the air are unlike. We know that bodies similarly electrified repel, bodies differently electrified attract each other; and for this reason the electricity of the air is all the time passing to the earth and that of the earth to the air, and equilibrium is thus maintained. Because moist air is a good conductor of electricity, the evaporation which is continually going on facilitates this interchange. When, however, the air is dry the transference takes place with difficulty. When water vapor is condensed in the upper strata of the atmosphere, electrical energy is generated. As electricity resides on the surface of a body, it follows that when the minute particles of a cloud are uniting to form raindrops, their electrical potential or amount of electricity is rapidly rising. Now, when the electrical potential of a cloud becomes much higher than that of the earth or another cloud, a discharge takes place between them through the air. Dry air, as has been said, is a nonconductor, but when there is much electricity it can force its way across an interval of air; and as the resistance of the air is very great the electrical energy is converted into heat and the particles of air are set in such violent commotion that they become luminous. The white-hot air expands suddenly and then suddenly contracts, setting up a succession of air waves along the line of the flash. These reach the ear as thunder. The prolonged rumbling of thunder is due partly to echo and reverberation and partly to the fact that the sound waves along the line of discharge reach the ear at different intervals, the discharge being sometimes several miles in extent.

There is no absolute and complete

safeguard from the destructive power of lightning, though lightning conductors or lightning rods on the tops of buildings serve to equalize the potential of the earth and clouds and prevent a disruptive discharge. Danger to buildings in the open country is greater than in cities. Among forest trees the oak is oftenest struck, the beech least frequently. See CLOUD; RAIN; STORM; LIGHTNING ROD.

**Lightning Rod,** a device for protecting ships and buildings from damage by lightning. In its most effective form it consists of flat strips of metal, either iron, steel or copper, having their upper ends pointed and their lower ends sunk deeply into the moist earth. The intermediate points should be connected with the building, preferably to those parts containing metal, like a water pipe, cornice or roof. Glass insulators should never be used, for they do more harm than good. The chief work is not so much to protect the building which lies directly in the field of the lightning's discharge, but rather to prevent discharges by leading off and gently dissipating the lightning's powerful electrical currents. Lightning rods were suggested by Benjamin Franklin. See ELECTRICITY; FRANKLIN, BENJAMIN; LIGHTNING.

**Lightship.** See LIGHTHOUSE, subhead *Lightship.*

**Lig'nite.** See COAL, subhead *Brown Coal.*

**Lig'num Vitæ,** *Vī' te,* a tropical or subtropical tree of the Bean Caper Family, seven or eight species of which are known in Florida, Mexico, Central America and the northern Andean region. The bark is scaly, and the cylindrical branches are marked at intervals by swollen joints. The wood and resin are both valuable; the former, because of its hardness, is used for making pulleys, mallets, bowling balls, ship blocks and sinkers; the latter is a constituent of many medicines.

**Li Hung Chang,** *Le' Hoong' Chang',* (1823-1901), a Chinese statesman. In 1864 he was associated with Charles George Gordon, known as "Chinese Gordon," in putting down the Taiping rebellion in China, and was richly rewarded for his services. While viceroy of the Province of Pechili, he showed his zeal for progress by encouraging many improvements. He negotiated treaties with various countries and began the building of a Chinese navy. During the war with Japan (1894) he was in charge of affairs and was sent to negotiate for peace in 1895. After representing China at the coronation of Nicholas II of Russia in 1896, he visited the principal nations of Europe and the United States. The highest honors were conferred upon him wherever he went. Li Hung Chang was the most enlightened and progressive Chinese statesman of his time. He started Chinese trading companies, supported the construction of railways and laid a foundation for that progress in Western civilization which is gradually securing a foothold in China.

**Lilac,** *Lī' lak,* a common shrub of the Olive Family, popular in dooryards and parks because of its beautiful foliage and flowers. There are many varieties, most of which grow to the height of small trees. The leaves have broad bases and fine-pointed apexes, and are a cool green color that makes a pleasing background for the white or lilac-colored blossoms. These blossoms grow in thick fragrant clusters that open in May, perfuming the air and delighting the eye. The single blossoms have tubular corollas with four spreading divisions and short, yellow stamens. The Persian lilac is a smaller shrub than the common lilac and has narrower leaves and fine feathery clusters of flowers. The common lilac is native in Hungary.

**Lille,** *Leel,* or **Lisle,** *Leel,* a city of northern France, capital of the Department of Nord, situated on the Deûle River, 154 m. by rail n.e. of Paris. The buildings include the Renaissance town hall, the Palace of Fine Arts, various churches, the prefecture, several museums and picture galleries. Among important industries are the spinning of flax, lace making, cotton spinning and

the manufacture of woolen fabrics, tobacco, oil, white lead, sugar, military stores and locomotives. Printing, refining saltpeter and distilling are also large industries. The trade is chiefly in raw materials, especially in wheat. The city is strongly fortified; buildings were erected on the site before 1030. Population in 1906, 196,624.

**Lil'y,** a name applied to a number of species of the Lily Family and to a few similar flowers of other families. Lilies are characterized by their scaly bulbs, parallel-veined leaves and six-parted flowers. In the majority of lilies the petals are recurved and the flowers nodding. They vary in color, being principally white, yellow and red. The wood lily and the southern red lily have erect blossoms. The white lily of any species is an emblem of purity. It is the national flower of Italy. The sego lily is the state flower of Utah.

Some of the most common wild and garden lilies are: tiger lily, day lily, wood lily, Canada lily, southern red lily, Turk's cap lily, red lily, Japan lily, Chinese lily and long-flowered lily. Other so-called lilies are the Atamosco and the St. James lily of the Amaryllis Family; the blackberry lily of the Iris Family; and the pond and water lilies.

**Lily-of-the-Valley,** a well-known and always loved plant of the Lily Family, which grows wild in rocky woods but is better known as a garden or border plant. The leaves and flower stalk grow directly from a fleshy bulb; thus the plant is practically stemless. The leaves are smooth, light green in color, and have broad, pointed blades. The flower stems are exceedingly slender and bear a row of nodding, bell-like flowers, delicate in appearance and of delicate fragrance. As the lily is the emblem of purity, the lily-of-the-valley is the emblem of youthful purity and innocence.

**Lima,** *Le' mah,* the capital of Peru, situated on the left bank of the Rimac River, 7 m. from Callao. The streets are paved with cobblestones; among the pleasure resorts of the city are the public gardens and the Paseo Colon, with its long drives, paths and statues and shrubbery. The finest statues in Lima are those of Columbus, Bolivar and Bolognesi. The public buildings and institutions include the Exposition Palace, the National Library, the University of San Marcos, the Cathedral begun in 1535, several churches, convents and technical schools. Within recent years the manufacturing interests have developed rapidly, and cotton and woolen textiles, cottonseed oil, chocolate, cocaine, macaroni, soap and candles are produced. The city was founded in 1535 by Pizarro, capitulating to the Chileans in 1881. During the two years that the invaders occupied Lima, all the public buildings were ravished and the city suffered an irreparable loss of art treasures, books and apparatus of the technical schools. The inhabitants are to a large extent of negro descent or of foreign birth. Population in 1906, estimated at 140,000.

**Li'ma, Ohio,** a city and county seat of Allen Co., 71 m. n. of Dayton and 72 m. s.w. of Toledo, on the Ottawa River and on the Pennsylvania, the Erie, the Lake Erie & Western, the Detroit, Toledo & Ironton and the Cincinnati, Hamilton & Dayton railroads. Lima is known as an interurban as well as a railroad center, having excellent electric service by six lines to Dayton, Findlay, Cleveland, Toledo, Columbus and Fort Wayne, Ind. Oil refining is one of the principal industries. Lima has an area of over six square miles and has broad paved streets and avenues and well-kept lawns. There are many substantial homes and handsome residences. Faurot and Lincoln are the largest of the city parks. Other semipublic parks include Hoovers, McBeth's, McCullough's and the Lima Driving Park, said to have the best one-half mile driving track in the state and known as the "Lexington of Ohio."

Among the principal buildings are the Allen County Courthouse, Masonic Temple, the Metropolitan and Holland blocks, Allen County Memorial Building, Y. M. C. A. Building, the Lima Club, Elks' Home, city building, Faurot Opera

House, a number of fine hotels, six banks and about 35 churches. The educational institutions include a high school, a public library, 11 ward schools, St. Rose and St. John's parish schools and Lima Business College. There is a well-equipped city hospital; the Lima Hospital and the Ohio State Asylum for the criminal insane adjoin the city on the north, and the Tuberculosis Hospital adjoins it on the west.

There are numerous oil wells in the vicinity, and crude oil and gas are also piped in from Western States. The important manufacturing industries include extensive locomotive and car works, structural-iron and bridge works, lubricating-oil works and manufactories of awnings and fixtures, cement blocks, bed springs, electrical motors and supplies, galvanized-iron cornices, harness, horseshoes, nitroglycerin, oil-well tools, paints, soda sirups, tile roofing, steel oil cars and other diversified products. There is a wholesale trade in petroleum, farm and dairy products. Large repair shops of two railroads are located here. The city owns and operates the waterworks.

Lima was laid out as a town in 1831 and first organized as a city under a general state law in 1842. Population in 1910, 30,508.

**Lime,** a small tree closely resembling the lemon and belonging to the same genus of the Rue Family, and sometimes classed as a variety of lemon. Its branches are crooked and spreading, its leaves more rounding than those of the lemon and its fruit more nearly spherical. The tree itself is hardier than most citrons; hence it is found in wider areas. In the United States it is grown in the Southern and the Western states, and in Mexico is a common tree. The fruit is put to the same use as the lemon, but less commonly on account of the sharpness of its juice. The linden, a tree of the Linden Family, is sometimes called the lime tree, more frequently in Europe than in the United States. In the South the tupelo, or sour-gum tree, of the Dogwood Family, is also called the lime, probably on account of its sour fruit.

**Lime,** the oxide of the metallic element calcium and known in chemistry as one of the alkaline earths. When pure, lime is white and does not fuse, except by the intense heat of the electric furnace. It is obtained pure by heating Iceland spar (calcium carbonate) to bright redness, when the carbon dioxide is driven off and lime is left.

QUICKLIME. Quicklime, the lime of commerce, is produced by burning limestone or marble in kilns. When water is poured on it, it swells and great heat is produced, leaving a light, white powder or a moist mass, depending upon the amount of water used. This is hydrate of lime, or slaked lime. On exposure to the air for a long time, quicklime takes up moisture and carbon dioxide and becomes air-slaked.

Lime is used in the making of mortars, cements and paper pulp, for purifying illuminating gas, for removing hair from hides previous to tanning, for sterilizing the soil and in the manufacture of glass. Lime, as a phosphate, constitutes the principal part of the earthy material in the bones of animals and is also found in the ashes of all plants. In various combinations, lime is diffused throughout the earth and is contained in many natural waters, and is the chief cause of the hardness of these waters. See LIMESTONE.

**Lime Light,** or **Ox"yhy'drogen Light,** a very brilliant, white light produced when oxygen and hydrogen are mixed and ignited, and the flame is directed upon a solid piece of lime. It is commonly used in theaters and in magic-lantern work for illuminating purposes. A steel cylinder containing oxygen under pressure and one containing hydrogen or illuminating gas supply a burner in which is held the lime, which is heated to a white heat and produces the light. These are called by theatrical people calcium or lime lights, as lime is oxide of calcium. Electric lights with powerful reflectors have superseded them where the electric current is available. See HYDROGEN; OXYGEN; CALCIUM; ELECTRICITY; STEREOPTICON.

**Limestone,** the general term applied to rocks which are composed of carbonate of lime and sometimes of carbonate of magnesia. In texture it varies from coarse to fine, the several grades being magnesian, clayey, sandy and crystalline (marble). Important varieties are compact, foliated, granular, calcareous, peastone and statuary limestone. The color varies from pure white to black. Iceland spar is one of the purest varieties. Limestone is used extensively in building, as a flux in smelting iron ore and in the manufacture of glass. Hydraulic limestone is an aluminous variety having the property of hardening under water after it has been baked. It is widely used in the manufacture of cement for paving and other purposes. See MARBLE.

**Li'monite,** an important ore of iron occurring in the form of rounded masses, the chief varieties of which are brown hematite and bog iron ore. It is moderately hard, somewhat brittle, brown in color and opaque. It is found in Europe and parts of Great Britain; and it occurs in great abundance in the United States, rich and valuable deposits being found in Virginia and Alabama. See IRON AND STEEL.

**Lim'pet,** a name given to a number of families of Mollusks which are of wide distribution. The European limpets are small and have spreading conical shells. They fasten themselves to rocks between high- and low-tide lines and depend upon the waves to bring them their food. The keyhole and bonnet limpets are smaller and coarser and are not valued as food. They are used to a slight extent as bait for lobster pots and fishing floats.

**Limpo'po,** a river in the eastern part of South Africa. It rises in the Transvaal Province, west of Pretoria, flows northwest, and, after receiving the Marico and forming the boundary between the Transvaal Province and Bechuanaland Protectorate and Southern Rhodesia, it flows southeast and empties into the Indian Ocean through Delagoa Bay. The total length is 1000 m., but only a small part of it is navigable, and its commercial importance is slight.

**Lincoln, Abraham** (1809-1865), sixteenth president of the United States and one of the world's greatest statesmen. He was born in Hardin County, Ky. His paternal ancestor, Samuel Lincoln, came to Massachusetts from England in 1637 and settled at Salem. The descendants moved to Pennsylvania and then to Virginia, where they were recognized as people of good family and considerable property. Abraham's grandfather, Abraham Lincoln, sold his Virginia property and moved to Kentucky about 1780, settling near his friend and kinsman, Daniel Boone. Abraham's father, however, Thomas Lincoln, was a roving, shiftless man, unable to read and hardly able to write his name. He married Nancy Hanks, a vivacious woman of good character but humble family. The cabin to which Thomas Lincoln took his young wife was built of logs, and contained but a single room, with a packed dirt floor, a window without glass, and a doorway without a door. There was a pole bedstead in one corner, blocks of wood served for chairs, and a split log on pole legs for a table. The fireplace was built of sticks and stones plastered with clay. In this cabin Abraham Lincoln was born, a fine, strong, healthy child. Under such conditions he had little chance for an education and, in fact, attended school less than a year in all his life, but his mother taught him to read, and he early became extremely fond of books.

BOYHOOD AND YOUTH. In 1816, when Abraham was seven years old, the family moved to Indiana, where the first winter was passed in a "half-faced camp," a shed built of logs, enclosed on three sides and open on the fourth. The next year a log cabin was built, and three-legged stools in place of blocks were considered a great improvement in the furniture. Abraham slept in an attic loft, to which he climbed by means of wooden pegs in the wall. In this new country and under such primitive conditions the boy grew to manhood, living

ABRAHAM LINCOLN

in the out-of-doors, helping on the farm, eking out the family income by working for neighbors at 25 cents a day, reading every book on which he could lay his hands, and coming to be recognized as the strongest, keenest, brainiest, wittiest lad in the entire countryside.

In 1818, when he was nine years old, his mother died, and the following year his father married Sarah Johnson, a capable widow who was fond of her stepson and materially aided his development. She brought to the home a little property, which added to its comfort, while her energy and thrift did much to better conditions. Later in life Lincoln paid grateful tribute to his mother and his stepmother for their influence in molding his character. The books which he had were few, but these he read and reread until they became a part of his very life. They included the Bible, *Æsop's Fables, Robinson Crusoe, The Pilgrim's Progress,* Weem's *Life of Washington* and a history of the United States; and probably Shakespeare, Burns and the lives of Henry Clay and Benjamin Franklin,—a choice library, if a limited one. He sometimes walked several miles to borrow a book. He gained knowledge of arithmetic by ciphering on a wooden shovel with a piece of charcoal, whittling off the surface of the shovel when it became covered with figures. He also acquired an elementary knowledge of grammar and the rudiments of surveying.

In 1830 his father again moved, going on into Illinois where he settled in Macon County, on the banks of the Sangamon. Abraham, now a young man of 21 years, six feet and four inches tall, lanky, strong and muscular, remained at home long enough to assist in building a house and to break 15 acres of land and split rails to fence it. He then started out for himself. He made two trips to New Orleans in a flatboat, where he learned to abominate slavery. He became clerk in a general merchandise store, enlisted in the Black Hawk War, and finally engaged in business with a worthless partner. The firm failed, and Lincoln was forced to years of economy to pay the debts. He now engaged in the study of law, supporting himself by acting as deputy county surveyor and postmaster of New Salem.

Early Public Life. Lincoln early became interested in politics. He was an unsuccessful candidate for the State Legislature in 1832, but was elected in 1834 and served for eight years, taking rank among the leading members from the first. After entering the Legislature he did not return to New Salem, but was admitted to the bar and formed a law partnership in 1837 at the state capital, where he gradually built up a good practice. In 1842 he married Miss Mary Todd, a young Kentucky woman of good family whom he met while she was visiting friends in Springfield. He was elected to the House of Representatives in 1846, but was not a candidate for reelection.

He had now become the most influential exponent of Whig principles in Illinois, and was much in demand; but he gave his attention chiefly to his practice, and attained a commanding position at the bar. The passage of the Kansas-Nebraska Bill and repeal of the Missouri Compromise in 1854 aroused his political ardor once more, and he began in earnest the contest against the extension of slavery. He was a candidate for United States senator in 1854, but withdrew in favor of Lyman Trumbull. In 1858 he was again a candidate, in opposition to Stephen A. Douglas, the Democratic incumbent. In the ensuing campaign the two candidates engaged in the famous series of debates that made of Lincoln a national figure. His presentation of what had come to be the great national issue was so clean-cut, logical, comprehensive and fearless, at the same time expressed in a style so simple, direct and earnest, that it was evident a new statesman and orator of unusual ability had entered the political arena.

Election to the Presidency. Lincoln was defeated for the Senate by Douglas, but this did not disturb him; he was contending for a great principle,

not merely for a senatorial appointment. The impression made by his debates was deepened by his remarkable Cooper Institute speech in New York City early in 1860, followed by speeches throughout New England, in which he appealed powerfully to the intellectual convictions and moral conscience of the entire North. When the Republican National Convention met in Chicago in 1860 he was the logical candidate for president, and was nominated on the third ballot. The Democratic Party was divided between two candidates, Stephen A. Douglas and John C. Breckinridge, and Lincoln was victorious in the fall elections. Although he had made the statement that he did not propose to interfere with slavery where it already existed, yet excitement in the South rose to fever heat at his election, which was the signal for secession in South Carolina, followed by similar action in others of the Southern States. The conciliatory attitude of the new President in his inaugural address of March 4, 1861, could not stay the rising tide of secession, and war was made inevitable by the bombardment of Ft. Sumter on April 13.

The Civil War. During the bitter and bloody contest of the next four years Lincoln bore upon his great heart the burden of both North and South, the sorrow of mourning wives and mothers, the horrors of the slain and wounded, the perplexing conduct of the war, the responsibilities of State, until seams of care lined his cheeks and aged his benignant face. Practically an untried man when he came to the presidency in the greatest crisis the nation ever faced, his firmness, sagacity, determination, generosity, sympathy and intellectual power were increasingly demonstrated as the war progressed. First of all, his purpose was to preserve the Union intact, and, next, to prevent the further extension of slavery. He had no intention of abolishing slavery unless as a necessary war measure. Such an emergency finally arose, in his judgment, and on Sept. 22, 1862, he issued a preliminary proclamation to the effect that in all states or parts of states still in rebellion on Jan. 1, 1863, the slaves should be forever free; and on the latter date he issued the final Emancipation Proclamation freeing the slaves in the designated territory.

In the midst of the struggle Lincoln was unanimously nominated by the Republican Party for a second term, and, although the issue was for a time in doubt, he was elected by a safe majority in the fall of 1864. His second inaugural address is one of the world's remarkable State papers, rising to the highest level of true oratory and laying bare the animating purpose of a great man. Soon after the inauguration the broken and exhausted remnant of Lee's great army surrendered to Grant at Appomattox Courthouse, and a few days later Johnston surrendered to Sherman. The Civil War was ended.

Death of Lincoln. In the midst of the universal rejoicing the nation was plunged into deepest gloom by the assassination of President Lincoln at Ford's Theater on the evening of April 14. He died the next morning. The funeral was unparalleled in popular demonstrations of affection and grief. Throughout the long journey from Washington, by way of New York and Albany, to Springfield, Ill., where the body was interred, thousands of people viewed the remains in silent sorrow. European rulers and statesmen united in paying tribute to one who had come to be recognized as a great man and ruler. Even the leaders of the South felt the magnanimity of his spirit, and joined in respectful regret at his death, feeling prophetically, perhaps, the tragic fate that removed from action the man who had forced the South back into the Union, who understood it and sympathized with it, and who was best fitted to heal the wounds of the war.

Estimate of Lincoln. An imposing monument has been erected to Lincoln's memory in the beautiful cemetery at Springfield; but his position is so secure in the hearts of men that no monument, however imposing, can add to his renown. Coming of humble parentage,

reared amid hardships and privations, without social prestige or influential friends, he forced his way to the highest pinnacle of fame by sheer intellectual power, animated by a mighty purpose and consecrated to a great cause. He was a statesman of the first order, with the ability to analyze a complex situation and put his finger on the heart of the issue, unconfused by incidentals; and having determined the main issue, to abide by it, unmoved by circumstances. He was a great orator. His debate with Douglas, his speech at Cooper Institute, his address at Gettysburg, his second inaugural address,—these have never been surpassed in their respective fields for greatness of thought, simplicity and purity of diction, earnestness of purpose and wealth of sympathy. He was one of the world's great men, great in intellect and in heart, in purpose and in sacrifice, in endeavor and in achievement. The tragedy of his death only added to the glory of his life, and the passing years have established his high position on the world's roll of honor.

He knew to bide his time,
And can his fame abide,
Still patient in his simple faith sublime,
Till the wise years decide.
Great captains, with their guns and drums,
Disturb our judgment for the hour,
But at last silence comes;
These all are gone, and standing like a tower,
Our children shall behold his fame,
The kindly, earnest, brave, foreseeing man,
Sagacious, patient, dreading praise, not blame,
New birth of our new soil, the first American.—Lowell, *Commemoration Ode.*

**Lincoln, Benjamin** (1733-1810), a prominent American soldier of the Revolution, born at Hingham, Mass. At the outbreak of the Revolution he helped organize the Continental army, and in 1776 became major-general of the Massachusetts troops. He was given a command at the siege of Boston and at White Plains and reinforced Washington at Morristown. In February, 1777, he was commissioned major-general in the Continental army, and was second in command to Gates in the Saratoga campaign. On Oct. 8 he was wounded and lamed for life, but resumed service the following August, when he superseded Gen. Robert Howe in the South. Lincoln recaptured Augusta, but suffered defeat at Brier Creek, Savannah and at Charleston, which, with 3000 prisoners of war, he was obliged to surrender May 12, 1780. He was exchanged in the spring of 1781 and received Cornwallis's sword at the surrender of Yorktown. He was secretary of war, 1781-1783, and he commanded the Massachusetts militia during Shays's Rebellion. In 1789 he became collector of the port of Boston.

**Lincoln, Ill.,** a city and county seat of Logan Co., 28 m. n.e. of Springfield, on the Illinois Central, the Chicago & Alton and other railroads. The town is surrounded by coal fields and is engaged in mining. Other industries include the manufacture of horse collars, mattresses, caskets, excelsior, cellulose and flour. The principal institutions are Lincoln University (Cumberland Presbyterian), the Illinois State Institution for Feeble-Minded Children, the Odd Fellows' Orphans' Home, St. Clara's Hospital and the Deaconess Home and Hospital. Among the attractions of the town are a Carnegie library building and an old courthouse, in which Lincoln practiced as a lawyer. Settled in 1835, Lincoln received its charter in 1857. Population in 1910, 10,892.

**Lincoln, Neb.,** the capital of the state and the county seat of Lancaster Co., on Salt Creek, 55 m. s.w. of Omaha, and on the Union Pacific, the Chicago, Rock Island & Pacific, the Missouri Pacific, the Chicago & North Western and the Burlington railroads. Lincoln is situated in the midst of rolling prairie land of great beauty and of great agricultural value. It has wide, attractive avenues, beautiful homes and pleasant parks. There are many public buildings of pleasing style; among these may be mentioned the state capitol, a city hall, the Federal Building, the county courthouse, St. Elizabeth's Hospital and Home for the Friendless, a Carnegie library and the new Lincoln Commercial Club Building.

In the city or its environs are located

the University of Nebraska, the Nebraska Agricultural College, the Nebraska Wesleyan University, Cotner University and Union College, the last three of which are denominational schools. The student population for 1913 is 8000, and in addition 8335 pupils were enrolled in the public schools. Aside from its Carnegie library, Lincoln has exceptional advantages in its university library, the state library and a state historical library. The state penitentiary and a state asylum for the insane are located in the suburbs, as are also the State Fair Grounds, where large annual state fairs are held. Being centrally located and upon many great railroad lines, Lincoln is an important commercial city. There are about 120 manufacturing plants in Lincoln, representing more than 150 different kinds of industries, whose output for 1912 was valued at $13,780,000. There are 150 jobbing houses, whose sales for 1912 amounted to $33,200,000. The manufacturing establishments produce mattresses, flour, brooms, paints, saddles and harness, overalls and shirts, sash and doors, brick and creamery products, gasoline engines, silos and many other articles. The largest individual creamery in the world is located in Lincoln. The limestone quarries yield excellent building stone and a variety of clay supplies local and domestic potteries.

Lincoln was originally settled because of its salt wells, which failed to live up to their early promise. Its first name was Lancaster, but when it became the state capital in 1867, the name was changed to Lincoln, since which time it has been a thriving city. Within a radius of five miles from the post office there reside 65,000 people. Population in 1910, 43,973.

**Lind, Jenny** (1820-1887), the celebrated Swedish soprano, born at Stockholm, the daughter of a lace manufacturer. She first appeared professsionally in Berlin in 1844, singing the leading soprano rôle in *Norma,* and subsequently she appeared in all the other German music centers, taking leading parts in all the principal Italian operas. In 1847 she visited England, where she was received with great enthusiasm, and three years later came to America. In 1852 she married Otto Goldschmidt, the composer, thereafter living in England. She died at Malvern Wells. To the exquisite natural purity of her voice were added a refined musical taste and a thorough understanding of the theory of her art. She possessed a rare combination of secondary gifts—beauty, ability as an actress, and a vital personality—which united to produce such a high degree of artistic merit as has never been surpassed. Sacred parts she sang with great religious fervor, and in their depth and grandeur they bore comparison with her operatic rôles.

**Lind'sey, Benajmin Barr** 1869-), an American judge and reformer, born in Jackson, Tenn. He was admitted to the bar in 1894 and seven years later became judge of the County Court and Juvenile Court of Denver. Judge Lindsey, who is an international authority upon juvenile delinquency, is responsible for the Colorado Juvenile Court Law and for the passing by the Colorado Legislature of the first contributory delinquency law against adults. In 1912 he became actively connected with Theodore Roosevelt in the organization of the Progressive Party. He has written *Problems of the Children, The Beast and the Jungle* and *The Rule of Plutocracy in Colorado.*

**Lin'en,** cloth made from the fiber of flax. Linen is one of the earliest used of any variety of cloth. The ancient Egyptians used it to wrap their mummies in and for official garments for the priests. Linen is frequently mentioned in the Bible; it was worn by the Greeks and Romans and has been a common fabric throughout Europe for centuries. The fiber of flax can be spun into a very fine thread; hence the most delicate fabrics, such as lawns, are made of linen. France, Belgium, Netherlands and Ireland are the leading countries in the manufacture of linen goods. The finer fabrics are used chiefly for table spreads and napkins and dress goods, and the

coarser varieties are used for towels and sometimes for bed linen. Some textiles contain a cotton warp and a linen woof. Linen thread is extensively used in the manufacture of lace. The value of linen consists in its uniform texture, its beauty of finish and its durability. See FLAX.

**Linnæus,** *Li ne' us,* **Carolus,** or **Linné,** *Lin' na,* **Karl von** (1707-1778), a Swedish naturalist and a botanist of the first rank. From his earliest years his tastes ran to the cultivation, study and collection of plants, and through the kindly direction of his early schoolmasters he was led along scientific lines. Later he continued his study at the University of Upsala, where he soon became director of the botanical garden, going from there to Netherlands for his medical degree. He became professor of medicine in the University of Upsala in 1741, a position which he soon exchanged for that of his friend Dr. Rosen, head of the botanical department. In this capacity Linnæus spent 37 profitable years, teaching, studying and carrying on original investigations. Students flocked to his lectures, and separating later, sent him specimens and data from all parts of the world, thus making his work and his collection unique and unsurpassed. For about ten years before his death his memory began to fail and his work became consequently less.

Linnæus laid the foundation for the study of modern botany, and his systems of plant nomenclature and of classification, though not followed today, were the means of systematizing all botanical study and paving the way for present methods. His descriptions were brief and accurate and his observations keen, thus making his work of lasting value.

**Lin'net,** a small bird of the Eastern Hemisphere, belonging to the Finch Family. Its plumage varies so greatly in different seasons, at different ages and for the different sexes, that it is difficult to recognize it at all times. Probably its most noticeable colors are those adopted by the male during the summer. Its plumage is then a rich brown, with head, neck and breast crimson and under parts creamy white. In the United States the house finch is sometimes called the linnet.

**Lino'leum,** a floor cloth made of linseed oil, cement and ground cork. The linseed oil is so treated that it becomes a solid, spongy mass. Rosin and kauri gum are then added and the compound is thoroughly mixed. If a plain linoleum is desired, the coloring matter is also added at this time. The ground cork is then added, and the mixture is spread upon a jute burlap and passed between rollers, which press it into the burlap and give it a uniform thickness and smooth surface. Figured linoleum is made by stamping the figures upon the surface, or by building the design with different colored cements.

**Linotype,** *Line' o type".* See TYPESETTING MACHINE, subhead *The Linotype.*

**Lin'seed Oil,** the oil made from the seed of flax by bruising, crushing and then by pressing. The crushed mass is sometimes steamed before being pressed, but the cold-pressed oil is better, as it is less likely to become rancid than the steam-pressed. When pure, linseed oil is colorless and has a disagreeable odor and taste. It is sold either as boiled or drying oil or as raw oil. The boiled oil contains a small quantity of oxide of lead, which causes it to dry quickly. It is generally used in paints and varnishes. The oil cake that is left after the oil has been pressed out makes a good food for cattle and poultry. See PAINT; VARNISH.

**Lion,** *Li' un,* one of the largest members of the Cat Family, particularly distinguished for its majestic appearance and for its fearful roar, probably the loudest made by any animal. No two lions are of the same color, but, in general, they are gray or tawny, and the kittens are marked with darker spots, which disappear after about six months. The face of the lion is calm and dignified when he is not aroused by anger or hunger. The body is from four to six feet long and, in the male, is surmounted by a heavy mane, varying in length in different individuals and giving

the body a singularly top-heavy appearance. The tufted tail is about one-half the length of the body and its furious lashing is a sign of great anger on the part of the king of beasts.

The haunt of the lion is a dense thicket or thorn-protected cavern where he is reputed to care for his family with great affection. Stories concerning him, however, are rather conflicting, and it is safe to say only that his actions can never be definitely foretold. Tales of his courage, his defense of his home, his refusal of any but freshly-killed food, are all met by equally stoutly maintained stories of his cowardice, his faithlessness and greed. Ordinarily, no doubt, he is satisfied to make a meal of the almost defenseless grazing animals of the jungle or clearing, but if pressed by hunger or emboldened by success, he does not hesitate to attack the elephant, rhinoceros or even the stockade-protected camps of man.

The lion lives to an age of between 30 and 40 years, a much shorter period than the life of the elephant but longer than that of most wild creatures of the jungle. Its whole life is marked by conflicts with rivals of its own race, enemies in the jungle, and man. When satisfied by a good meal and sure of its unassailable position, the lion is peaceable and not to be feared as an attacking enemy. In attack, however, it is swift and cautious in approach, sure in its spring and strong to carry away its prey. The larger specimens are three feet high and measure nine feet in length, but such dimensions are unusual.

Lions were once abundant in Africa and India, but in the advancement of exploration and colonization, their extermination is a necessity. They were formerly hunted by elephant-mounted parties, but as they have become more scarce and more nocturnal in habit, the hunters seek them either on foot or horseback by night, or lie in wait for them by the springs which are the scenes of their most common depredations.

**Lipari,** *Lip' a ree,* **Islands,** a group of small islands north of Sicily in the Mediterranean Sea. The group includes Lipari, the largest of the group, Salina, Vulcano, Filicuri, Stromboli, Panaria and Alicuri and a few islets. The islands are of volcanic origin and embrace a total area of about 455 sq. m. Notwithstanding their volcanic nature, scarcity of water and irregular surface, the islands are, as a rule, productive agriculturally, their products including wines and numerous Southern fruits. The climate is mild and healthful. Stromboli and Vulcano contain active volcanoes, the former having been the scene of an eruption in 1912.

**Lippi,** *Leep' pe,* **Fra Filippo** (about 1406-1469), one of the most noted Italian painters of the 15th century, the formative period of Italian art. Like those of all other artists of his time, his subjects were of a religious nature, and in the handling of them he showed the influence of his teacher, Masaccio. His work shows gentleness and sympathy in treatment and his color is soft and clear. His son Filippino Lippi also became distinguished as a painter. Among Fra Filippo's best paintings are *The Coronation of the Virgin,* now in the Florentine Academy; and *Vision of St. Bernard,* in the National Gallery, London.

**Liquid Air.** When the temperature of air is lowered to 220° below zero F. and it is then subjected to a pressure of 585 lb. to the square inch, it is changed to a liquid. C. E. Tripler of New York constructed apparatus and made many experiments showing the uses of liquid air, but they must be regarded as only curiosities, for the reason that it requires too much expenditure of power to produce liquid air in quantities. Liquid air absorbs heat rapidly from certain objects and boils violently until it evaporates, the nitrogen going off more quickly than the oxygen. All substances immersed in liquid air are instantly frozen. It is so much colder than ice that it boils rapidly when a can of it is set upon a cake of ice.

**Lisbon,** *Liz' bun,* the capital and principal seaport of Portugal, situated on the

bank of the Tagus River, about 7 m. from the ocean. Built in a succession of terraces up the sides of the hills at the foot of the mountains of Cintra, the city presents an appearance of beauty almost equal to that of Naples or Constantinople. The old Moorish citadel, the royal palace and the churches with their heavy ornaments, mosaics and towers, add to its picturesqueness. The fishing industry is important both because of its variety and size. The manufactures include pottery, cotton, wool, silk, paper, chemicals and tobacco. The shipbuilding industry is growing in importance. Tourist traffic from Germany and England constantly increases. In 1755 the greater part of Lisbon was destroyed by an earthquake and by the accompanying tidal wave and fire. Population in 1900, 356,009.

**Lisle,** *Leel.* See LILLE.

**Lis'ter, Sir Joseph,** BARON (1827-1912), an eminent English surgeon, the originator of modern antiseptic surgery, born at Upton, Essex. He took his medical degree at the University of London. After studies in Edinburgh in 1856, he became assistant surgeon and lecturer in that university, and in 1860 was made professor of surgery at Glasgow. He was successively professor of clinical surgery at Edinburgh, at King's College Hospital, London, and surgeon to the Queen. Lister made many important observations concerning blood coagulation and inflammation, but his greatest contribution to science was his application of the principles of antiseptics to the treatment of wounds. Previous to his discoveries, the most trivial operations often resulted in death, due to infection of the wound. His discovery that putrefaction in wounds is caused by bacteria introduced into the wound from the outside; that putrefaction might be prevented by keeping the wound free from germs; and that this might be accomplished by some germicide, such as carbolic acid, which would destroy the bacillus, laid the foundation of the principles of modern surgical practice. Lister was the recipient of many honors, and in 1897 was made a peer. Among his publications were *A Contribution to the Germ Theory of Putrefaction and Other Fermentative Changes* and *Effects of the Antiseptic System of Treatment upon the Salubrity of a Surgical Hospital.*

**Liszt,** *List,* **Franz** (1811-1886), an eminent Hungarian pianist and composer. At the age of six he began the study of music and soon attracted the attention of certain noblemen, who provided for his further education at Vienna and Paris. He acquired an extraordinary technique, which was reinforced by rare interpretative insight and subtlety of expression; and his pianoforte performances were marvelous. In 1848 Liszt became director of the Court Theater at Weimar, where he introduced the works of Schumann and Berlioz and also of Richard Wagner, who became his son-in-law. He retired to Rome in 1861 and joined the Franciscan Order of priesthood. Not only as a pianist was he distinguished, but also as a teacher, music critic and composer for piano and for orchestra. Among his published writings are a *Life of Chopin* and *Gypsies and Their Music.* His best-known compositions are the *Hungarian Rhapsodies* for piano.

**Liter,** *Le' ter.* See METRIC SYSTEM.

**Literature,** the term applied in a general sense to the written productions of a language or people, but often restricted to those productions which have enduring or artistic value. The province of literature is to record human thought, achievement and feeling, and it is universal in scope. The purpose of this article is to trace the progress of literature from its sources to its present proud position among the fine arts, from the period when the only written records were those engraved on stone or inscribed on clay tablets, down to the present age of the printing press.

The majority of readers are interested chiefly in what has been written in approximately modern times. It is true that the busy man and woman of today have not time to make a thorough study.

of the writings of the ancients, but by acquiring some knowledge of literary achievements in the past ages they will gain a keener appreciation of the literature of modern times. The story or poem that we delight in today is not a spontaneous production unaccounted for by any reference to the past. Literature has developed by stepping stones, and each age has contributed something to the progress of the next; hence a brief review of the universal literature will be an aid in the study of the literature that appeals to the reader of today.

### Ancient Literature of the Oriental Nations (4000 B. C.-1 A. D.)

Babylonia and Assyria. Recent excavations in the Euphrates Valley have brought to our knowledge the ancient literature of the Babylonians and Assyrians, whose written language is probably the oldest of which we have any record. Thousands of clay tablets have been excavated in that locality, on which are inscribed the peculiar wedge-shaped letters used by those peoples. The oldest of these tablets contain texts on mathematics, astronomy, medicine, history, language and religion, arranged and classified according to subjects. Inscriptions on stones have also been found, which give us valuable information about the early history of this region. One of these inscriptions is the oldest code of laws known to us, which Hammurabi, King of Babylon, had engraved on a stone pillar about 2200 B. C. In the seventh century B. C. Assyrian literature reached its highest point. Among the interesting relics of this period are hymns to the gods, some of which are similar to the psalms of the Old Testament, and two mythological poems, *The Deluge* and *The Descent of Istar into Hades.* See Cuneiform Inscriptions.

Egypt. The literature of ancient Egypt consists of inscriptions painted or engraved on obelisks and on the walls of temples and tombs, and of written manuscripts on papyrus. After the discovery of the Rosetta Stone in 1799, scholars were able to decipher the ancient Egyptian writing and to give to the world the translation of some of this remote literature. Previous to 3000 B. C. there were many inscriptions of a religious, biographical or historical nature, but most of these are not of literary interest. After 3000 B. C. there was great literary development. Inscriptions of every kind, historical, mythological and funereal, were made, and papyri in great numbers have survived. The Egyptians excelled all other Oriental peoples of antiquity in the narration of stories, and some of the papyri were collections of tales. One story, entitled *The Tale of Two Brothers,* contains the germ of our popular fairy tale, *Cinderella.* From a literary point of view the most important works of the ancient Egyptians are two epics, *Pentaur* and *Mohan.* Other forms of their literature are letters and fables. See Rosetta Stone; Papyrus; Hieroglyphics; Karnak, The Temple of.

China. Chinese literature is remarkable for its continuity, accuracy, variety and high moral tone. The oldest writings in existence refer to still earlier works which have not survived. The earliest gathering together of the Chinese literature occurred in the sixth century B. C., when Confucius compiled a famous group of writings consisting of five classical books. These contain the oldest monuments of Chinese poetry, history, philosophy and jurisprudence, which Confucius collected from various sources. This compilation has exerted a marvelous influence on Chinese manners, morals and customs down to our own time, and it constitutes the Chinese bible. Another important group of writings, the *Four Books,* was written by pupils and followers of Confucius. The ancient writings of the Chinese are more important for their influence on the people than for their literary quality. See Confucius.

The Hebrews. The literature of the Hebrews which we call the Old Testament has had a greater influence on the human race than any other book. Its fundamental idea, monotheism, or belief

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in one God, has persisted through all the years of Jewish history. The earliest beginnings of Hebrew literature are thought to be poetical. The opening phrases of the song of Moses in *Exodus xv,* the song of Deborah in *Judges v,* David's elegy over Saul and Jonathan, and other poetical portions of the Old Testament are probably older than the narratives in which they occur. The Old Testament covers a period of 900 years, dating from about the tenth century B. C. Authorities differ as to the order in which the different books were written. See BIBLE, subhead *The Old Testament.*

INDIA. The ancient literature of the Hindus may be divided into two periods, the Vedic and the Sanskrit. The literature of the first period is sacred and dates from about 1500 B. C., when the Aryan tribes who spoke the Sanskrit language emigrated to the northwestern portion of the Indian Peninsula. In this age were composed the prayers, hymns and precepts which were later collected in the form of the Vedas, the sacred books of the Hindus. The Vedas were written in poetry, in the most ancient form of the Sanskrit, and probably date from the 11th century B. C. In the next period the people penetrated into the valleys between the Indus and Ganges rivers and began a literature written in classical Sanskrit. Two great epics belong to this period, the *Mahabharata* and the *Ramayana.* These epics are the most important creations of Hindu literature, surpassing in magnitude the *Iliad* and the *Odyssey.* The Hindus also wrote lyric and dramatic poetry. The moral philosophy of India is contained in a work called *Code of Manu.* This is held to be as sacred as the Vedas, though composed several centuries later. It is worthy of note that the Sanskrit literature has now become the foundation of all philological studies. See VEDAS; LANGUAGE, subhead *Sanskrit Language.*

PERSIA. The literature of ancient Persia is mainly religious and includes the sacred books collected under the name Zend-Avesta. There are two other sacred books, one containing prayers and hymns, and the other, prayers to the genii that preside over the days of the month. There are also ancient Persian inscriptions consisting of about 1000 lines of cuneiform texts carved upon stone tablets and other hard substances. Of special interest is the document of Darius. On a portion of the rocky side of Mt. Behistun, he had engraved an account of his warlike deeds and the greatness of his empire. See ZEND-AVESTA; ZOROASTER.

### GREEK LITERATURE

Of the literature of ancient times, the Greek has influenced most profoundly that of our later civilization. In fact, the Greeks laid the foundation of modern thought in many departments; they perfected the most important types of poetry; and they brought to artistic form such divisions of prose as history, oratory and philosophy. Greek literature has three well-defined periods, the first beginning in remote antiquity.

I. EARLY LITERATURE (before 1000 B. C. to 475 B. C.). The earliest Greek poems extant are the great epics of Homer, the *Iliad* and *Odyssey.* Although they were written about 1000 B. C., the language in which they are expressed is so highly developed that it is certain they are the outgrowth of an earlier literature, which took the form of songs and religious and heroic poems. A second poet of the Homeric period was Hesiod, a native of Bœotia. He was the author of the first didactic poem extant, and his poetry, in general, was designed to be instructive. After the epic had been introduced, elegiac, iambic and lyric poetry were created. The father of lyric poetry was Archilochus, who lived in 670 B. C. The lyric was further developed by Sappho, Anacreon and Simonides of Ceos, and finally culminated in the work of Pindar, the national lyrist of Greece. Philosophy began in this period, the Greeks being the first people to distinguish it from religion and mythology. See ILIAD; HOMER; HESIOD; SAPPHO; ANACREON; PINDAR.

II. Period of Attic Literature (475 B. C.-323 B. C.). After the Persian Wars Athens became preeminent in Greece, both politically and intellectually, putting the stamp of her marvelous civilization on all the literature produced in this period. The literary achievements of this era of Athenian supremacy have never been surpassed. This age saw the perfection of dramatic poetry through the work of the three great tragic poets, Æschylus, Sophocles and Euripides. Aristophanes was the great master of comedy.

Literary prose was perfected in this period, in the fields of history, oratory and philosophy. The three great historians of Greece were Herodotus, Thucydides and Xenophon. Herodotus was the first writer of artistic prose and is justly regarded as the father of history. Thucydides introduced the philosophical element into his writings. Xenophon was the author of the *Anabasis,* a work familiar to every student of ancient Greek. The Attic orators produced the most finished specimens of prose. The most illustrious of these was Demosthenes, also the greatest orator who ever lived. The Greek philosophers, the most famous of whom were Socrates, Plato and Aristotle, have exercised a potent influence on Western thought. See Æschylus; Euripides; Aristophanes; Sophocles; Herodotus; Thucydides; Xenophon; Demosthenes; Socrates; Plato; Aristotle; Drama.

III. Literature of the Decadence (323 B. C.-1453 A. D.). The downfall of Grecian independence was followed by a decline in literature. After the conquest of Greece by Philip of Macedon and Alexander the Great, the Egyptian city of Alexandria superseded Athens as an intellectual center. Certain prominent tendencies in literature, science and philosophy which had their origin in Alexandria have been included under the term *Alexandrian School.* Strictly speaking, there were two Alexandrian Schools, the first being a school of poetry and science; the second, a school of philosophy. The former, with which this article is concerned, embraces the literary and scientific activity of the rule of the Ptolemies, from 323 B. C. to 30 B. C., when the Ptolemy dynasty was overthrown by the Romans. Ptolemy Soter (reigning 323-285 B. C.), began to gather about him a circle of learned men, besides laying the foundations of the great Alexandrian Library (See Alexandrian Library), and his successors also encouraged literature. The poetic forms chiefly cultivated by the Alexandrians were the epic, lyric and elegy, and the most distinguished poet was Callimachus. Many historians flourished, of whom the best known are Timæus and Polybius. Among the critics, Aristophanes of Byzantium, Aristarchus and Eratosthenes are especially noteworthy. The sciences of mathematics, astronomy and medicine were also successfully cultivated by such famous men as Euclid, Archimedes and Hipparchus. After the conquest of Greece by the Romans, Alexandria was gradually superseded by Rome as a literary center. Here flourished the historians Josephus and Plutarch, and the scientists Ptolemy and Galen.

Greek literature declined rapidly after Constantinople became the seat of government of the empire. It derived the most of its importance from the vast amount of history that was produced. The Eastern Roman Empire rendered its greatest service to literature in preserving for centuries the ancient classical learning. When Constantinople fell in 1453, Greek scholars who fled from the city brought to western Europe valuable manuscripts of the Greek classics, thus aiding in the great revival of learning of the 15th century. See Euclid; Archimedes; Hipparchus; Josephus, Flavius; Plutarch; Ptolemy; Galen, Claudius; Renaissance.

### Roman Literature

In its influence on the world, the literature of Rome ranks next to that of Greece among the ancient literatures. The Romans were inspired in their writings by the Greeks, but they set the stamp

of their own peculiar genius on what they produced, and their literature, though lacking the grace and beauty of the Greek, was characterized by correctness and accuracy. In general, the Greeks considered beauty the ideal in all art; the Romans, utility. Strictly speaking, Rome had no literature until 241 B. C., the end of the First Punic War, but we know that there was a period of crude beginnings. Certain allusions point to the custom of chanting heroic lays and indicate that village festivals were celebrated with songs and dances. Legal codifications, official records and oratorical discourses existed. Thus there were the germs of a literature before 241 B. C.

I. Early Literature (241 B. C.-83 B. C.). The first literature of this period consisted chiefly of translations of Greek models into Latin. The innovator of this kind of writing was a Greek slave named Livius Andronicus. Nævius has the honor of being the first Roman poet. His chief works were comedies and an epic poem on the Punic War. Ennius, who wrote a history of the Romans in hexameter verse, was the most influential writer of this period. Plautus and Terence were the greatest writers of comedy. The prose of the period consisted of oratory, history, jurisprudence and grammar. Also in this period Lucilius gave permanent form to satiric poetry. See Ennius, Quintus; Plautus; Terence.

II. Age of Cicero (83 B. C.-43 B. C.). Latin prose attained a high degree of excellence in this period. The chief literary figure was Cicero, whose writings are models in style and composition. Other prose writers were Varro, who wrote on law, history, philosophy, grammar and agriculture; Sallust, the first true historian; and Cæsar, whose *Commentaries* are read in every high school. See Cicero, Marcus Tullius; Cæsar, Caius Julius.

III. Augustan Age (43 B. C.-14 A. D.). The period beginning in 43 B. C. was especially remarkable for its poetry. Vergil, who wrote the great Roman epic, the *Æneid,* and Horace, author of epistles, satires and odes, were the two greatest poets. Lucretius, Ovid and Catullus also contributed to the glory of this age. The greatest prose writer of the period was the historian Livy. See Vergil; Æneid; Horace; Livy; Catullus, Caius Valerius.

IV. Silver Age (14-117 A. D.). After the death of Augustus came the decline of Roman literature. Although conditions under some of the emperors were discouraging to the production of an independent and original literature, a few names in this period stand out brilliantly. Juvenal was the most illustrious of the satiric poets, and Lucan was the leading epic poet. Tacitus ranks among the great Roman historians, Quintilian, among the rhetoricians. Pliny the Younger is remembered for his charming letters. Seneca was the most eminent of the philosophers, and Pliny the Elder, author of a voluminous work on natural history, met a martyr's death in the eruption of Vesuvius. See Tacitus, Publius Cornelius; Quintilian.

V. Middle and Later Empire (117-526). Authors were numerous in the closing period, but few are interesting from a purely literary point of view. The most valuable works were the legal writings and those of the Church Fathers. During the fourth and fifth centuries A. D. the Roman tongue rapidly degenerated and finally ceased to be a living language. The great contribution of the Romans to civilization is in the field of legal and political science. Their writings in this department are absolutely unique, showing no trace of Greek influence. See Justinian; Augustine, Saint.

### Arabian Literature

Arabian literature is of especial importance to us because it forms the connecting link between that of ancient and modern times, and its brilliant and rapid development is one of the main events of the Dark Ages. Before the time of Mohammed there had been inscribed on Egyptian paper a number of songs composed by their ancient poets, but Arabian

literature proper begins with the Koran, the Mohammedan bible, whose scattered leaves were collected in 633 by the successor of Mohammed. The fourth caliph from Mohammed began the extension of royal favor to letters, and in the early part of the ninth century Bagdad became a great literary center. From this time on until the 14th century the Arabians were active in spreading their learning throughout the whole Islam Empire.

In the realm of pure literature, we are especially interested in their poetry and tales. They were of an intensely poetical nature and their poetry is distinctly Oriental, being characterized by boldness of figure, richness of fancy and extravagance of expression. The fascinating collection of stories known as *The Arabian Nights' Entertainment* is familiar to every one. These tales, so richly imaginative and so brilliant in conception, have influenced in no small degree the literature of the southern part of Europe, and they are today read with delight by every nation into whose language they have been translated. See MOHAMMED; KORAN; ARABIAN NIGHTS' ENTERTAINMENT, THE.

### ITALIAN LITERATURE

The Italian language was first used for literary purposes in the 13th century. Previous to this time Latin was used in prose, and French and Provençal in poetry. The real founder of Italian literature was Dante, whose *Divine Comedy* is one of the world's greatest poems. Two other writers added to the glory of this early literature: Petrarch, most illustrious of Italian lyrists, and Boccaccio, first writer of Italian classic prose. Petrarch and Boccaccio were enthusiastic students of the ancient classics and helped to bring about the revival of classical learning in Italy. The literary men of the latter part of the 14th century, and of the 15th, were so devoted to this study of the ancients that little native literature was produced for a century.

A new era began in the closing years of the 15th century during the reign of the Florentine despot, Lorenzo the Magnificent, himself a poet and patron of learning. The 16th century was a brilliant one. Among the eminent poets of this time were Ariosto and Tasso, authors of romantic and heroic epics. The most distinguished prose writer was Machiavelli, novelist and historian.

The 17th century, a period of lethargy and decline, was followed by a general intellectual awakening, and the 18th century saw the development of the Italian opera and of the comedy and tragedy. In the 19th century Italy became a united and independent nation, and the struggle for liberty was reflected in much of the literature. Fogazzaro and D'Annunzio take high rank among modern Italian writers.

English literature is greatly indebted to that of Italy, for the sonnet of Petrarch has been the model for English lyrists, and Chaucer, Spenser and Shakespeare were directly influenced by Italian writers. See DANTE, ALIGHIERI; PETRARCH, FRANCESCO; TASSO, TORQUATO; MACHIAVELLI, NICCOLÒ; BOCCACCIO, GIOVANNI; ARIOSTO, LUDOVICO; ANNUNZIO, GABRIELE D'; ALFIERI, VITTORIO.

### FRENCH LITERATURE

The poems of the troubadours and trouvères are the chief literary productions of the early literature of France. The troubadours, who flourished in southern France, had a brilliant but temporary popularity from about 1100 to about 1400. Their language, the Provençal, eventually sank to a mere dialect. The trouvères, who were the poets of Normandy, were important during the 12th century. Their romances, tales and dramatic productions influenced materially the literature of England and of the other southern European nations. The first important prose writer appeared in the 14th century. This was Froissart, author of a history of the different states of Europe from 1322 to 1400. Sir Walter Scott called Froissart his master.

The Golden Age of French literature is the period between 1500 and 1700,

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which includes two great movements, the Renaissance and the Reformation. The chief writers of the 16th century are Rabelais, who typified the Renaissance, Calvin, who typified the Reformation, and Montaigne, a brilliant essayist and the first French philosophical writer in prose. The reign of Louis XIV has been called the Augustan Age of French literature. The drama was brilliantly developed through Molière, master of French comedy, and Corneille and Racine, great tragic dramatists. This age also produced La Fontaine, the most distinguished of French fabulists, and Fénelon, the author of a popular narrative.

In the 18th century lived the eminent dramatists Voltaire and Beaumarchais and the great novelist Le Sage. Other distinguished writers were Rousseau and Montesquieu. In this century skeptical philosophy reached its culmination, having its logical outcome in the French Revolution. In the second quarter of the 19th century there originated a movement for greater freedom in literary form. This Romantic movement, begun by Chateaubriand, was triumphantly consummated in the work of the great novelist Victor Hugo, but Romanticism as a movement was of short duration. The novelists, Dumas, Balzac, George Sand, Zola, Daudet and Maupassant; the critics, Sainte-Beuve and Gautier; and Alfred de Musset, poet, dramatist and novelist, are other eminent writers of the 19th century. French literature of today is remarkable for the excellency of its fiction and drama. The leading dramatist, Rostand, is a foremost European writer.

In general merit and quantity French literature excels that of any other European nation. The French have produced no great epic and few great tragedies, and none of their writers ranks with Shakespeare. On the other hand, their short stories, both in prose and verse, are unequaled, and their songs are the most graceful and their comedies the most laughable that the world has ever seen. French literature is, moreover, so clearly expressed, so charming in style and so frankly typical of the French people, that it will always be read with delight. See TROUBADOUR; TROUVÈRE; RABELAIS, FRANÇOIS; CALVIN, JOHN; MOLIÈRE, JEAN BAPTISTE; CORNEILLE, PIERRE; RACINE, JEAN; LA FONTAINE, JEAN DE; VOLTAIRE; HUGO, VICTOR MARIE; DUMAS, ALEXANDRE; SAND, GEORGE; SAINTE-BEUVE, CHARLES AUGUSTIN; ZOLA, ÉMILE; LE SAGE, ALAIN RENÉ; BALZAC, HONORÉ DE; ROSTAND, EDMOND.

### Spanish Literature

Like other peoples, the Spanish first expressed themselves in poetry, and their earliest written production, *The Poem of the Cid,* is the oldest epic in any of the Romance languages. This poem, composed about 1200, celebrates the deeds of a great Spanish hero. The literature of Spain from the 14th century to the 16th consisted mainly of ballads, chronicles, romances of chivalry and religious dramas, all of which were dominated by the two prevailing traits of Spanish character, religious sentiment and loyalty. In the 12th century Provençal literature was introduced into Spain, but it did not long endure. In the early part of the 17th century Cervantes published his *Don Quixote,* a story that has had continuous popularity to this day. Contemporary with Cervantes was Lope de Vega (Vega Carpio), creator of the modern drama. The development of the Spanish drama in the 17th century forms a brilliant epoch in the literature of Spain. When the Bourbons succeeded to the throne of Spain, French influence became dominant, and Spanish literature was greatly influenced by the French in the 18th and 19th centuries. In the latter part of the 19th century the novel received special attention. See CERVANTES SAAVEDRA, MIGUEL DE; DON QUIXOTE; VEGA CARPIO, FELIX LOPE DE.

### Portuguese Literature

The earliest literary productions of Portugal are fragments of ballads, Provençal in character, which were sung

by wandering minstrels. The first poets of importance flourished in the 15th century, when modern Portuguese began to take form. In the early part of the 16th century the foundations of a national literature were laid by Sá de Miranda, the most influential poet of his time. The greatest genius Portugal has ever produced is Camoens (1524-1580). His great masterpiece, an epic called the *Lusiad,* is about the only Portuguese poem known outside the peninsula. In modern Portuguese literature we find the novel and poetry reaching a high degree of excellence. See Camoens, Luis Vaz de.

### Russian Literature

The beginnings of Russian literature are found in translations, from Old Church Slavic, of the Bible and books for use in the Church service. During the period of the Tartar invasion (1224-1237) literary progress received a check, and there was no serious revival until the 16th century. In the next century the first Russian newspaper was established. The greatest name in the literature of the 18th century is Lomonosoff (1711-1765). His works on rhetoric, grammar and versification laid the foundation of modern Russian literature. About the same time Sumarokoff established the pseudo-classical tragedy. The Romantic movement of the 19th century spread to Russia, and poetry received a great impetus. Pushkin, the greatest poet of Russia, successfully drew his materials from Russian antiquity and popular legends. Gogol (1809-1852) was the first great novelist. Turgeniev, Gorky, Dostoyevski and Tolstoy are the greatest names in modern Russian literature. See Gorky, Maxim; Turgeniev, Ivan; Tolstoy, Leo.

### Dutch Literature

Of the various languages spoken in Holland and Belgium, the Dutch is the most important, and from an early date it has been the literary language of the inhabitants of Holland. The first literary works were translations of songs of minstrels and romances of chivalry. In the middle of the 13th century a Dutch translation of *Reynard the Fox* was made. About the same time, the first noted author, Jacob Maerlant, translated the Bible into Flemish rhyme. Erasmus, Grotius and Arminius were famous Latin writers of the Reformation period. The first writer of the 16th century who used the native tongue was Anna Byns, the "Flemish Sappho."

The marvelous development of the country in the 17th century had a parallel in literary progress, the chief writers being Hooft, poet and historian, Vondel, lyric, epic and tragic poet, and Jacob Cats, author of didactic and descriptive poems. The 18th century was, in general, a period of decline, though some very good poetry was written. The overthrow of the Dutch Republic was accompanied by a revolution in literature, and a number of poets and historians arose who reflected in their works the spirit of the new age.

The noteworthy writers of the early part of the 19th century were Bilderdijk, one of Holland's great poets, and Van der Palm, an eminent prose writer. Most of the literature produced by the Hollanders in the closing years of the 19th century was influenced by the scientific spirit. Dutch literature as a whole is marked by earnestness, simplicity and religious feeling. See Erasmus, Desiderius; Grotius.

### German Literature

The first literary production of the Germans that we know about is a translation of the Bible into Gothic, by Ulfilas, Bishop of the Goths (d. about 381). During the next 400 years their literature consisted of the songs of minstrels, which were collected by Charlemagne, though only two relics of this ancient poetry have come down to us. When Charlemagne became emperor, he endeavored to improve in every way possible the intellectual condition of his people. Through his efforts literature received a stimulus, and in the ninth and tenth centuries poetry, the drama, prose and translations received attention.

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The period from 1140 to 1300 is the first Golden Age of German literature. The language used was Middle High German. This was the time of the Crusades and of chivalry, of splendid tournaments and gay festivals, of magnificent cathedrals and growing cities. The court of the Hohenstaufen dynasty favored the literature of chivalry, which flowered brilliantly for a century and a half. The minstrels of this age were called minnesingers, from an old German word meaning love. The greatest production of this time was the *Nibelungenlied,* a folk epic containing the hero songs of the leading German tribes, which had been sung for centuries by wandering minstrels. A second national epic, the *Gudrun,* also belongs to this period. Numerous romances of chivalry were translated at this time; of special interest are those relating to Arthur and his knights of the Round Table, probably obtained from Britain. Stories about Charlemagne were translated from the French, and a third group relates to the ancient classical heroes. Early in the 12th century we also find the beginnings of the drama in the miracle and mystery plays. The literature of the 14th and 15th centuries is inferior, consisting mainly of the poetry of the mastersingers and the prose writings of the monks.

In the 16th century came Luther and the Reformation. This century saw the beginning of modern German literature. Luther's translation of the Bible and his stirring hymns gave the German people a literary language, and they justly regard him as the creator of German prose. Second in influence to Luther was Melanchthon. The leading poet of this period was the mastersinger Hans Sachs. After the death of Luther the confused condition of affairs in Germany, culminating in the Thirty Years' War, had a disastrous effect on the literature, and it was not until the 18th century that it again reached a high degree of excellence.

In the 18th century the four great writers were Klopstock, creator of the modern German lyric; Wieland, author of the famous romantic poem *Oberon* and the first writer to familiarize the Germans with Shakespeare; Lessing, author of the first masterpiece of German comedy; and Herder, influential as a poet, theologian, philosopher and critic. These writers paved the way for the second Golden Age of literature of the 19th century. This illustrious century produced the great poetic dramatists, Goethe and Schiller, and a host of other writers in various fields; poetry, the drama, philosophy, history, science, literary criticism, the novel and the fairy tale, were all developed through the excellent work of men and women who helped to place German literature among those of first rank. At the opening of the 20th century, Hermann Sudermann and Gerhart Hauptmann were notable literary figures. See NIBELUNGENLIED; MINNESINGER; MASTERSINGER; LUTHER, MARTIN; SCHILLER, JOHANN; LESSING, GOTTHOLD EPHRAIM; GOETHE, JOHANN; KLOPSTOCK, FRIEDRICH GOTTLIEB; WIELAND, CHRISTOPH MARTIN; HERDER, JOHANN; HEINE, HEINRICH; UHLAND, JOHANN LUDWIG; GRIMM, JACOB AND WILHELM.

### Scandinavian Literature

The Scandinavian languages include the Icelandic, Norwegian, Danish and Swedish. Originally, a fairly uniform language, known as primitive Scandinavian, was used by the inhabitants of Scandinavia, but between 700 and 1000 this language began to show forms of differentiation, and by 1000, four separate dialects could be distinguished. The Icelandic and Norwegian are often comprehended in the term *Western Scandinavian;* the Danish and Swedish in the term *Eastern Scandinavian.*

ICELAND. About 900 Iceland was colonized by certain inhabitants of Norway who were unwilling to remain the dependents of a conqueror who had introduced the feudal system. After this time there was developed in Iceland a distinct West Norwegian dialect, which by the year 1000 could be designated Icelandic. The literary history of the island can

be divided into two main periods, Old Icelandic and New Icelandic, the former dating from 900 to the time of the Reformation. The earliest and most important monument of Icelandic literature is the so-called *Poetic Edda,* a collection of poems of varying length, and probably dating from the tenth century (See EDDA). The earliest Icelandic prose appeared in the 12th century, when Ari the Wise composed a history of the island. About a century later Snorri Sturluson produced a history of the early kings of Norway, entitled the *Heimskringla,* which is still read in Iceland. In 1222 he completed the *Prose Edda,* containing stories of the gods and goddesses. Also in this early period there were composed in prose, numerous tales known as Sagas, valuable not only as literary productions, but also for the light they throw upon Old Norse customs (See SAGA). The poetry of the scalds (See SCALD) is another form of early Icelandic literature.

Modern Icelandic literature began in 1530, when printing was introduced into the island. During the 17th century many scholarly works were written and grammars and dictionaries compiled. At this time, and down to the present, numerous poets flourished.

DENMARK. Danish literature previous to the Reformation is unimportant; for several centuries Latin was used as the literary language. Christian Pedersen, who was the first to set up a printing press, printed a complete translation of the Bible in Danish in 1550, and is regarded as the father of Danish literature. The first writer of world-wide fame was Tycho Brahe (1546-1601). Holberg (1684-1754) was the founder of Danish comedy and the creator of the modern literature of Denmark, for he wrote for the people and made their tongue a popular literary medium. Evald (1743-1781), a disciple of the German Klopstock, was the first lyric poet and tragic dramatist. He was also the author of the national song of Denmark, *King Christian.*

The literature of Denmark came under the influence of German thought in the early part of the 19th century, resulting in a new school of poets. The most important of these poets was Oehlenschläger, who combined the legends of the Eddas into one great poem. The last century has produced many distinguished names in prose and poetry, but the one best known to English readers is that of Hans Christian Andersen. The 19th century also produced the great critic, Georg Brandes. See BRAHE, TYCHO; ANDERSEN, HANS CHRISTIAN; BRANDES, GEORG MORRIS COHEN.

SWEDEN. Ancient Swedish literature exists in the form of runes. These indicate that at an early date the country possessed many legends and hero tales. After the introduction of Christianity the literature was chiefly of a religious nature, though romances of chivalry were popular. After the Reformation poetry was especially developed, and in the 17th century literary taste showed great improvement. In the 18th century French influence was dominant in Sweden as in other European countries. The effect on Swedish literature was to make it formal and lacking in originality and imaginative quality. Of the prose writers of this period, Dalin is especially interesting for establishing a periodical modeled on Addison's *Spectator.* His services to Swedish literature were much the same as Addison's to English literature. King Gustavus III, who began to rule in 1771, was a patron of learning and a dramatist of merit. The best poets of the period were Kellgren, Leopold and Oxenstjerna.

With the decline of French influence there came a reaction and the rise of new schools of literature. The great Romantic movement of the 19th century deeply influenced Swedish literature, resulting in many productions that were national in character. Foremost among the writers of this century were Geijer, a poet and the first historian of Sweden, Tegnér, the greatest of her poets, and Runeberg, the national poet of Sweden and Finland. Among the many Swedish novelists of the 19th century, Fredrika Bremer gained special distinction. A noted Swedish writer of more recent

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date is Selma Lagerlöf, who in 1909 was awarded the Nobel prize for literature. August Strindberg (d. 1912) was an eminent novelist and dramatist. See BREMER, FREDRIKA; LAGERLÖF, SELMA; RUNEBERG, JOHAN LUDVIG; TEGNÉR, ESAIAS; STRINDBERG, AUGUST; RUNES.

NORWAY. The early period of the Norwegian language is similar to that of the Icelandic. Between 1350 and 1530, Norwegian was influenced by the Swedish and Danish languages, and when, in 1397, the Union of Kalmar lost for Norway her independence, Danish was substituted for the native language in matters of literature and public business. The modern standard language differs slightly from the Danish spoken in Denmark, and is sometimes spoken of as Dano-Norwegian. National Norwegian literature is generally regarded as dating from 1814, when Norway was separated from Denmark. However, early Norwegian literature is preserved in the Eddas of Iceland, and there were numerous writings by Norwegian authors during the period when Norway and Denmark were politically one. The period of broadest development in Norwegian literature began with Ibsen and Björnson, Norway's most eminent writers. Lie and Kielland were other important writers of this epoch. See IBSEN, HENRIK; BJÖRNSON, BJÖRNSTJERNE.

## ENGLISH LITERATURE

To study the progress of a literature written in the tongue that we speak, is manifestly a delightful task. Because of their importance and interest to our readers, English writings are given relatively greater space than those of other nations. Special articles are devoted to the literature of the United States and that of Canada.

I. ANGLO-SAXON PERIOD (600-1066). The story of English literature is as old as the story of the English people, and, like their history, it had its beginnings in Continental Europe, where their Anglo-Saxon forefathers of Denmark and northern Germany delighted to hear the wild battle lays and sea minstrelsy of their gleemen. The most important relic of this early poetry is the epic *Beowulf,* written in its present form on English soil, probably in the eighth century. After the Anglo-Saxons had conquered the island, Old English literature began to take form through the writings of Cædmon, the first poet of Christian England; Bede, the father of English poetry; and King Alfred, the father of English prose. See BEOWULF; CÆDMON; BEDE; ALFRED THE GREAT; ANGLO-SAXON CHRONICLE.

II. FROM THE CONQUEST TO THE DEATH OF CHAUCER (1066-1400). The period dating from the Norman Conquest of England to the death of Chaucer is sometimes known as the Anglo-Norman Period, for during the three and a half centuries following 1066, the English language, becoming the basis of our modern speech, was wonderfully enlarged and enriched by its contact with the language of the Norman-French, while the conquerors, representing the highest culture of Europe, brought new elements to English life and literature that were to prove of lasting benefit. The literature of the first century and a half following the Conquest, during which time the French language was dominant, consisted chiefly of metrical romances, rhyming chronicles and religious poems, written in French or Latin, and is of interest to us as the source of some later English productions. About 1205, however, the native literature awakened from its 150 years of slumber with the appearance of a poem called *Brut,* written by a priest, Layamon, who told in the English tongue the legends of King Arthur. Religious poems and romances in verse began to follow, together with some charming little lyrics which sang of the glories of the spring and of the birds and blossoms. About 1362 appeared an alliterative allegorical poem entitled *The Vision of William Concerning Piers the Plowman* (See LANGLAND, WILLIAM), and about the same time Wiclif began a translation of the Bible. See WICLIF, JOHN.

During the second half of the 14th century, Geoffrey Chaucer, the first great poet, produced that masterpiece of Middle English literature, the *Canterbury Tales.* Not only did he reveal the permanence and vitality of a newly developing literature, but he used the East-Midland dialect so effectively that it became the standard literary language from which Modern English is derived. Chaucer's death in 1400 marks the end of what we may term the preparatory period in English literature. See CHAUCER, GEOFFREY.

III. FROM THE DEATH OF CHAUCER TO ELIZABETH (1400-1558). The century following the death of Chaucer was an era of change, and the times were not suited to the production of a creative literature. The chief activity in the field of poetry was the making of ballads, and the important prose production of the century was Sir Thomas Malory's account of the legends of King Arthur (See MALORY, SIR THOMAS). The first part of the 16th century is memorable for the *Translation of the New Testament* by William Tyndale, for the production of the first English comedy, *Ralph Roister Doister,* and for the introduction of the sonnet and of blank verse (See WYATT, SIR THOMAS; SURREY, HENRY HOWARD, EARL OF; UDALL, NICHOLAS). The second half of the century saw the ushering in of the most brilliant period in the history of English literature, the Elizabethan Era.

IV. ELIZABETHAN PERIOD (1558-1625). The splendid achievements of the Elizabethan Age were the result of certain events of world-wide importance. These were the introduction of printing into England by Caxton in 1476, the revival of classical learning, the discovery of America, and the Protestant Reformation, events which tended to free men's minds, direct their interests into new channels and make life infinitely more rich and varied. The reign of Elizabeth brought peace and unity to the nation and gave opportunity for the working out of the new world-forces in a marvelous, creative literature. The spirit of the age was felt beyond the reign of Elizabeth, through the reign of James I. Poetry reached a degree of excellence never since surpassed, through the works of Shakespeare, Spenser, Marlowe, Jonson and their contemporaries; representative prose writers were Bacon, Hooker, Raleigh, Sidney and Lyly. The most important work was accomplished in the field of lyric and dramatic poetry, but to this age belongs that masterpiece of English prose, the King James Version of the Bible. See SHAKESPEARE, WILLIAM; CAXTON, WILLIAM; SPENSER, EDMUND; MARLOWE, CHRISTOPHER; JONSON, BEN; RALEIGH, SIR WALTER; BACON, SIR FRANCIS; SIDNEY, SIR PHILIP.

V. FROM THE ELIZABETHAN PERIOD TO THE RESTORATION (1625-1660). The period between 1625 and 1660 was one of religious controversy and social and political change, and the age as a whole was not favorable to literary effort. In this period the Puritans became dominant in government and social life, and their influence on literature is seen in the theological and argumentative trend of the prose of the times. The great writer of the period was Milton, whose early poems were written soon after the death of James I, and whose masterpiece, *Paradise Lost,* appeared after the Stuarts had been restored and the Commonwealth had passed into history. *Paradise Lost,* though essentially Puritan in theology, is marked by sublimity of thought and expression and is one of the world's great epics. See MILTON, JOHN.

VI. RESTORATION PERIOD (1660-1700). The Restoration of the Stuart line in 1660 was followed by a marked reaction against Puritanism, and much of the literature of the period was a reflection of the ungodly and frivolous court of Charles II. The drama was revived, but the plays written were so corrupt that they are not read today. The two greatest writers of the period were John Bunyan, whose story *The Pilgrim's Progress* is the best allegory in the English language; and John Dryden, critic, dramatist and poet. Modern

prose is indebted to Dryden for his adoption of the unified sentence, and in both prose and poetry he set an example of correctness. This was the period of the formation of new literary ideals, a notable example being the adoption of the rhyming couplet as the suitable poetic form. The writings of the period show the influence of French literature. See DRYDEN, JOHN; BUNYAN, JOHN.

VII. EIGHTEENTH CENTURY PERIOD (1700-1800). The tendency of the writers of the preceding period to adhere to definite literary rules had its culmination in the 18th century, which in its literary aspect was an age of regularity. Form counted for more than originality of thought. In the first half of the century Swift produced his classic in the field of satire, *Gulliver's Travels;* admirable essays were written by Addison, whose charming prose style is effectively expressed in that unique contribution to periodical literature, the *Spectator;* Defoe gave the world *Robinson Crusoe,* the forerunner of the modern novel. The leading poet of the times was Pope, a writer whose influence on his age was remarkable. Although his poems are models of perfect form, they lack the imaginative element and human interest that we look for in poetry of the highest type. Pope used the rhyming couplet with the highest degree of skill.

Samuel Johnson, poet, essayist and dictionary maker, is the central literary figure of the second half of the century, though his fame rests more on his personality and influence than on his writings. Goldsmith, contemporary of Johnson, is remembered for his excellent plays, his charming story, *The Vicar of Wakefield,* and his poems, which, though written in the form of those of Pope, are quite different in spirit and foreshadow the poetry of a new age. In this period the novel was brought to definite form through the writings of Richardson, Fielding, Smollett and Sterne. Two great writers of history were Hume and Gibbon, and oratory was perfected by Burke.

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This century is also remarkable for the beginnings of a revolt against the school of poetry of which Pope was the leader. A group of poets began to write in a manner which showed a definite departure from the old ideal, both in form and subject matter. These poets displayed an interest in the beauties of natural scenery and in the feelings of man in the humble walks of life. The greatest of them, the Scottish poet, Burns, wrote his exquisite lyrics in the closing years of the century, preparing the way for the new movement of which Wordsworth was the apostle. See SWIFT, JONATHAN; ADDISON, JOSEPH; STEELE, SIR RICHARD; DEFOE, DANIEL; POPE, ALEXANDER; JOHNSON, SAMUEL; GOLDSMITH, OLIVER; RICHARDSON, SAMUEL; FIELDING, HENRY; SMOLLETT, TOBIAS; STERNE, LAURENCE; BURNS, ROBERT.

VIII. PERIOD OF ROMANTICISM (1800-1837). The revolt against the old style of poetry was fully consummated in the poetry of the Romantic Period. The poems of this era express the beauties of external nature and the effect of nature on man. They glow with feeling, show a wide range in style and assert the right of man to express his spiritual instincts with sincerity and freedom. The greatest of these poets, Wordsworth, Coleridge, Byron, Shelley and Keats, were all passionately devoted to the ideal of freedom in thought and form, yet each was individual in the poetic expression of his ideals.

Not only in poetry, but also in prose was the Romantic movement expressed. We find in the literary criticism of the period a broader view and a more sympathetic appreciation of literature. The leading exponents of the Romantic School of criticism were Hazlitt, Lamb and De Quincey. Lamb, however, is best remembered for his delightful *Essays of Elia.* In the realm of fiction, the most notable productions were the romances of Scott and the stories of English life written by Jane Austen. See WORDSWORTH, WILLIAM; COLERIDGE, SAMUEL TAYLOR; BYRON, GEORGE NOEL; SHELLEY, PERCY BYSSHE; KEATS,

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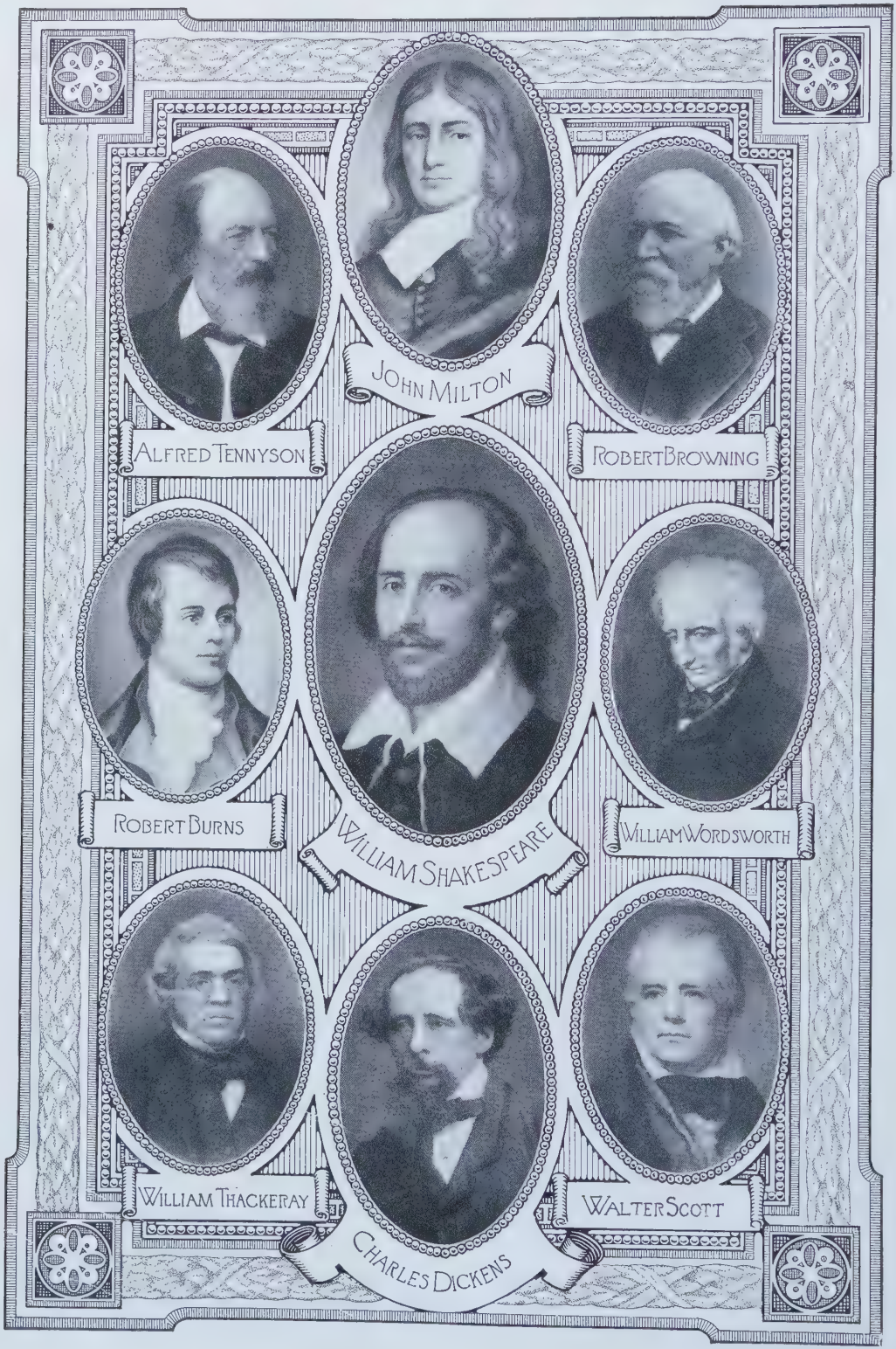
JOHN; LAMB, CHARLES; DE QUINCEY, THOMAS; SCOTT, SIR WALTER; AUSTEN, JANE.

IX. VICTORIAN PERIOD (1837-1901). With the passing away of the writers of the Romantic Period, there came a few years' lull in literary effort, but during this interval new forces were developing which had a tremendous effect on the literature that was produced during the reign of Victoria. With the growth of democracy, the advancement of science and the development of commerce and industry came the awakening in the masses of a demand for social justice, and this demand was voiced by many of the writers. Thus the literature may be said to have an ethical purpose. The brilliant achievements of Thackeray, Dickens, George Eliot, Meredith and many other novelists, in the realm of fiction, and the work of the essayists and literary critics, Macaulay, Arnold, Carlyle and Ruskin, have made the prose of the Victorian Age outrank that of any other period in extent, variety and finish in style. In poetry, Tennyson and Browning were the two great masters. Of the lesser poets, Mrs. Browning, Rossetti and Swinburne produced work of enduring value. Notable work was also accomplished in this period in history, philosophy and science. See THACKERAY, WILLIAM; DICKENS, CHARLES; ELIOT, GEORGE; MACAULAY, THOMAS; ARNOLD, MATTHEW; CARLYLE, THOMAS; RUSKIN, JOHN; TENNYSON, ALFRED; BROWNING, ROBERT; BROWNING, ELIZABETH BARRETT; SWINBURNE, ALGERNON.

X. LITERATURE OF TODAY. English literature of the 20th century has great variety and interest. Thomas Hardy, whose greatest novels were produced in the Victorian Period, remained a notable literary figure at the opening of the new century. The group of modern writers of fiction includes Rudyard Kipling, Maurice Hewlett, Leonard Merrick, Gilbert K. Chesterton, Hall Caine, A. Conan Doyle, Herbert G. Wells, Mrs. Humphry Ward, Edward V. Lucas, E. Temple Thurston, William De Morgan, Anthony Hope Hawkins and Arnold Bennett. A number of British dramatists are contributing to a genuine revival of the acted drama, and many of the plays now seen in the theaters reveal that these playwrights are animated by a desire to represent British life as it is actually lived. Henry A. Jones, James Barrie, Bernard Shaw, John Galsworthy and Sir Arthur Pinero form a notable group of successful dramatists. Among the poets, Alfred Noyes and John Masefield are attracting much attention. There is also activity in the fields of criticism, history and biography. The literary phase of the Irish national movement will be found treated in the topic IRISH PLAYS and in the biographies of Lady Gregory, William B. Yeats and John M. Synge. See KIPLING, JOSEPH RUDYARD; HEWLETT, MAURICE HENRY; CHESTERTON, GILBERT KEITH; CAINE, THOMAS HENRY HALL; DOYLE, SIR ARTHUR CONAN; WARD, MARY AUGUSTA; DE MORGAN, WILLIAM FREND; HAWKINS, ANTHONY HOPE; BENNETT, ENOCH ARNOLD; JONES, HENRY ARTHUR; BARRIE, JAMES MATTHEW; SHAW, GEORGE BERNARD; GALSWORTHY, JOHN; PINERO, SIR ARTHUR WING; MASEFIELD, JOHN; NOYES, ALFRED; MOORE, GEORGE; MERRICK, LEONARD; LUCAS, EDWARD VERRALL; PHILLIPS, STEPHEN.

### AMERICAN LITERATURE

I. COLONIAL AND REVOLUTIONARY PERIOD (1607-1800). The character of the writings of the American people during the first two centuries of their history was determined largely by material conditions. The early colonists had to deal with the problems of conquering the wilderness, subduing the Indians and building homes, and in such conditions there is little leisure for the production of a creative literature. Later the struggle with the Mother Country and the effort to found a new government occupied their attention. Their interests, too, lay in religious rather than purely literary works. Consequently, during the 17th century the greater proportion of the writings were theological and his-

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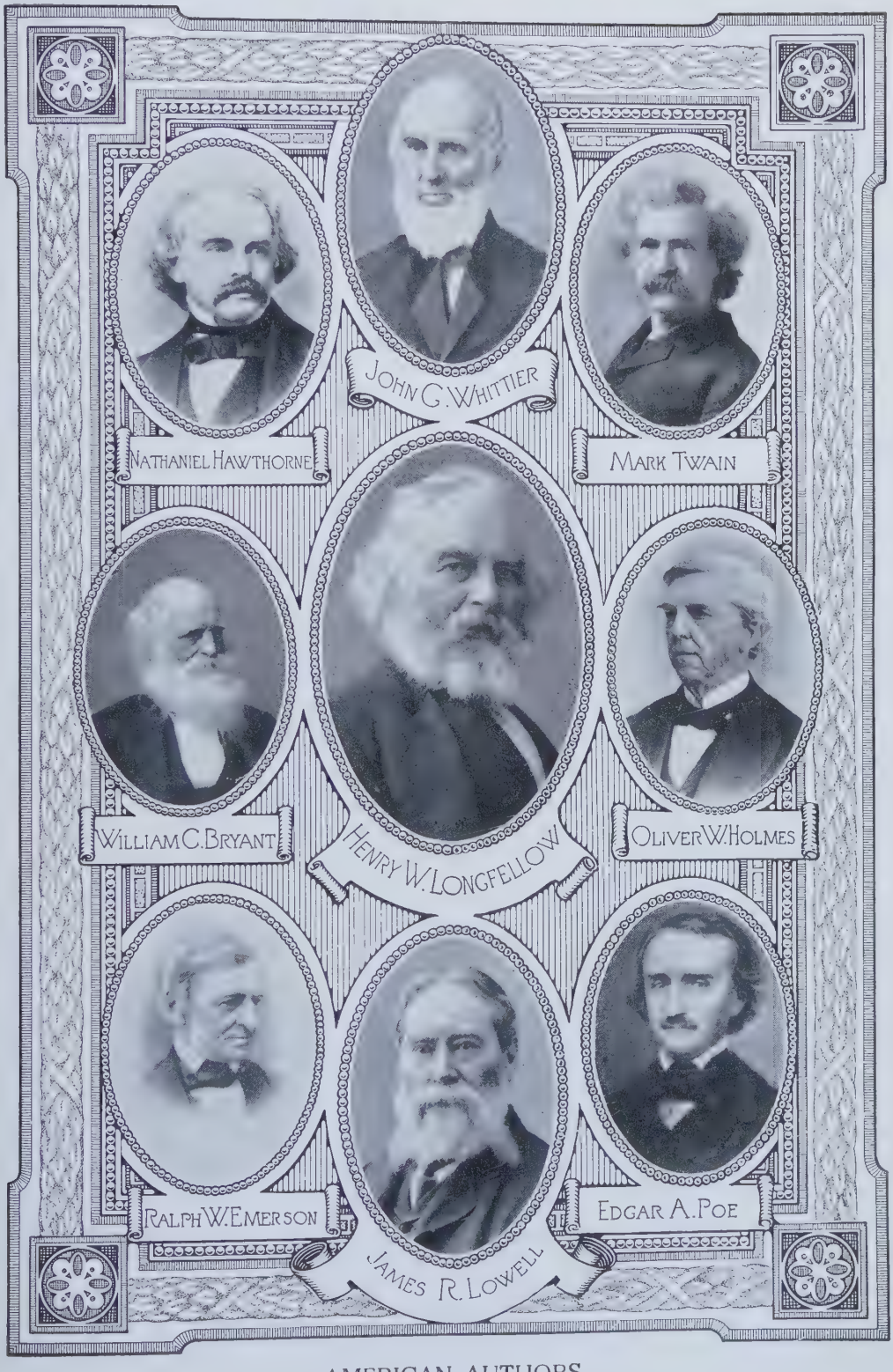


AMERICAN AUTHORS

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torical in character. The first book printed in the colonies, the *Bay Psalm Book,* appeared in 1640. Of the poetic writings of this time those of Anne Bradstreet best deserve a place in literary history.

The theological writings of Cotton Mather and Jonathan Edwards occupy a prominent place in the literature of the 18th century. The greatest name of this century is that of Benjamin Franklin (1706-1790), whose *Autobiography* is a truly literary classic. Toward the end of the century a group of poets arose, known as the "Hartford Wits." The most important of these were John Trumbull and Joel Barlow. Contemporary with these was the poet Philip Freneau, whose works show real literary excellence. Mention should also be made of the writings of the public men and orators of Revolutionary fame, contained in the collection of political essays known as *The Federalist.* In the closing years of the century the first American novelist appeared, Charles Brockden Brown. See FEDERALIST, THE; FRANKLIN, BENJAMIN; BROWN, CHARLES BROCKDEN.

NATIONAL PERIOD (1800- ). Washington Irving was the first American man of letters to win recognition in Europe. Irving's charming essays and miscellaneous prose, Cooper's novels and Bryant's poetry were the best literature of the early part of the 19th century. A little later appeared Poe (1809-1849), the most original genius America has ever produced. Taking a general view of the period beginning in 1800, we find American literature developing along definite lines and various departments represented by able writers. The earlier group of historians, consisting of Bancroft, Prescott, Parkman and Motley, has given us scholarly and fascinating narratives covering a wide field. Of a later date are John Fiske, John B. McMaster, Woodrow Wilson and James Ford Rhodes. Of our statesmen, Webster, Lincoln and Hay have permanent places in literary history.

The best American poetry after Poe was produced by the famous New England group consisting of Longfellow, Whittier, Emerson, Holmes and Lowell. The last three were also eminent prose writers, and Emerson was the most distinguished of a group of writers who came under the influence of German philosophy and who belonged to what was known as the Transcendental School. Walt Whitman and Sidney Lanier are two other earlier poets whose work has endured. Many later poets are typically American in theme and style; of these we may mention Eugene Field, James W. Riley, Will Carleton, Bret Harte and Joaquin Miller. Mention should also be made of C. E. Stedman, William Vaughn Moody, Ella Wheeler Wilcox and Richard W. Gilder.

The greatest American novelist, Hawthorne (1804-1864), has had no equal, but fiction of decided merit has been produced since his time, both in the form of the novel and of the short story. In the middle of the 19th century came Mrs. Stowe's epoch-making work, *Uncle Tom's Cabin.* Story-writers since the Civil War have been numerous. At the head of American novelists of the later school is William Dean Howells, who has produced a series of stories depicting, in a strikingly realistic manner, contemporary American life. Henry James, a writer who has made his home in England for many years, has given us the "international novel." F. Marion Crawford is another novelist who chose foreign themes; his stories deal with contemporary Italian life. In a class by himself is that unique humorist Mark Twain, while Frank Stockton will be remembered for the quaintness and originality of his stories.

An interesting development of American fiction since the Civil War is the prominence given to local scenes and characters. A few years ago Edward Eggleston was writing stories of Hoosier life, while Thomas Bailey Aldrich in his *Story of a Bad Boy* vividly portrayed boy life in a New Hampshire town. Virginia has been represented by Thomas Nelson Page; the Tennessee Mountains

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by Charles E. Craddock; Kentucky by James Lane Allen; Louisiana by George W. Cable; Georgia by Joel C. Harris; the West by Bret Harte and Owen Wister; New England by Mary Wilkins Freeman and Kate Wiggin Riggs. From Frank Norris, Winston Churchill and William Allen White we have had studies of certain phases of American business and politics. Jack London and Hamlin Garland have produced stories of the adventure type. Among women novelists, Margaretta Deland, Edith Wharton and Frances H. Burnett have a high place. Other story-writers who have found favor are Richard Harding Davis, Robert Grant, Irving Bacheller, F. Hopkinson Smith, S. Weir Mitchell, Harold B. Wright, Alice Hegan Rice, Josephine Daskam Bacon, Kathleen Norris, John Fox, Jr., Robert Herrick and Mary Johnston.

The second half of the 19th century saw the production of creditable work in literary criticism, biography and the essay; representative names in these fields are Thomas W. Higginson, Edmund C. Stedman, Donald G. Mitchell, Charles D. Warner, Richard W. Gilder, George E. Woodberry, Brander Matthews, Thomas R. Lounsbury, Henry Van Dyke, Hamilton W. Mabie, John Burroughs and Ida Tarbell. The greatest monument of American scholarship is the Variorum edition of Shakespeare, by Horace H. Furness. Most of these writers are treated in separate biographies.

### Canadian Literature

The literary writings of the Canadians are marked by freedom and vigor, and show the influence of a new country which has magnificent possibilities. French-Canadian literature had its beginnings in the writings of the old French explorers and missionaries, who recorded in prose and poetry their impressions of New France. A list of the writers of this period would include such names as Cartier, Champlain, Father Hennepin and Pierre de Charlevoix. As the country was opened to settlement and trade, many works of a descriptive and historical character were produced, chief among which was Garneau's *History of Canada,* completed in 1852. Of the French-Canadian poets, Louis H. Fréchette (1839-1908) was generally regarded as the representative poet of French Canada.

The first English-Canadian writers were, like the French, explorers and historians. Notable among these early writers was Alexander Mackenzie, who wrote a narrative of his explorations. With the union of Upper and Lower Canada in 1841 came a new era in Canadian literature, and from this time the feeling of nationality is noticeable in verse and prose. This spirit has been still more marked since the establishment of the Confederation in 1867. The best English-Canadian poetry of the 19th century was produced by Archibald Lampman, Charles G. D. Roberts, William Wilfred Campbell, Bliss Carman and Sir Gilbert Parker. E. Pauline Johnson was honored as the poet of the Indians. Among others may be mentioned William D. Lighthall, Charles Mair, Duncan C. Scott and Robert Service. Fiction of high rank has been written by Charles W. Gordon (Ralph Connor) and Sir Gilbert Parker; Ernest Thompson Seton is preeminent as a writer on animal life; and J. Castell Hopkins is noted for his biographical writings. See Fréchette, Louis Honoré; Haliburton, Thomas Chandler; Lampman, Archibald; Roberts, Charles George Douglas; Campbell, William Wilfred; Carman, William Bliss; Parker, Sir Gilbert; Johnson, Emily Pauline; Lighthall, William Douw; Scott, Duncan Campbell; Hopkins, John Castell; Mair, Charles; Service, Robert W.; Gordon, Charles William; Seton, Ernest Thompson.

The chart on the following pages presents in chronological order the significant names in the literatures of America and England, as well as the most important of foreign nations. The chart is representative rather than exhaustive, especially those pages showing the writings of the 19th and 20th centuries.

| ENGLISH LITERATURE | FOREIGN LITERATURE |
|---|---|
| **Anglo-Saxon Period—600-1066**<br>*Beowulf*, Anglo-Saxon epic originated before 449, put in its present form by a Northumbrian poet, in the eighth century.<br>Cædmon, first Christian poet: *Paraphrase of the Scriptures*, about 670.<br>Bede, first historian: *Ecclesiastical History of the English People*, 731; science and philosophy.<br>Cynewulf: secular and religious poetry, about 750.<br>Alfred the Great: translations; *Anglo-Saxon Chronicle* begun under his direction, about 892. | The Koran, 633.<br><br>Poetry of the scalds, 800-1100.<br>*Elder Edda*, 10th and 11th centuries.<br>Firdousi: *Book of Kings*, 971-1006. |
| **From the Norman Conquest to the Death of Chaucer—1066-1400**<br>1066-1200—Latin and Norman-French writings.<br>Layamon: *Brut*, poetic version of the King Arthur legends, about 1205.<br>Ormin: *Ormulum*, devotional work in verse, about 1215.<br>Robert of Gloucester: *Chronicle of England*, in verse, about 1298.<br>Richard Rolle: *Pricke of Conscience*, about 1330.<br>William Langland: reputed author of *Piers the Plowman*, allegorical poem, 1362.<br>John Wiclif: *Translation of the Bible*, 1380.<br>John Gower: *The Lover's Confession*, about 1393.<br>Geoffrey Chaucer: *Canterbury Tales* (about 1386-91); and other poems, 1368-99. | Omar Khayyám: the *Rubáiyát*, about 1120.<br>*Nibelungenlied*, about 1140.<br>*The Poem of the Cid*, about 1200.<br>Wolfram von Eschenbach: *Parzival*, about 1205.<br>Snorri Sturluson: *Prose Edda*, about 1222.<br>Dante: *Divine Comedy*, 1314-21.<br>Planudes: collection of *Æsop's Fables*, about 1327.<br>Boccaccio: *Decameron*, 1348-53.<br>Petrarch: *Sonnets*, about 1348.<br>Froissart: *Chronicles*, 1372. |
| **From the Death of Chaucer to Elizabeth—1400-1558**<br>1400-1500—Century of Scottish and Border ballads.<br>Sir Thomas Malory: *Morte D'Arthur*, prose account of the Arthur legends, 1470.<br>William Caxton, first English printer: *Translation of Reynard the Fox*, 1481.<br>Sir Thomas More: *Utopia*, 1515-16.<br>William Tyndale: *Translation of the New Testament*, 1525.<br>Miles Coverdale: *Translation of the Bible*, 1535.<br>Nicholas Udall: *Ralph Roister Doister*, first English comedy, about 1536.<br>Roger Ascham: *Toxophilus*, 1545.<br>Sir Thomas Wyatt and the Earl of Surrey: first English sonneteers; sonnets published in *Tottel's Miscellany*, 1557. | Printing invented, about 1448.<br>Gutenberg: Mazarin Bible printed, 1450-55.<br>Machiavelli: *The Prince*, 1513.<br>Erasmus: *Translation of the Greek Testament*, 1516.<br>Luther: *Translation of the New Testament*, 1522.<br>Ariosto: *Orlando Furioso*, 1532.<br>Rabelais: *Gargantua*, 1535.<br>Calvin: *Institutes of the Christian Religion*, 1536. |
| **Reigns of Elizabeth and James I—1558-1625**<br>Thomas Sackville: *Mirrour for Magistrates*, in verse, 1559; *Gorboduc*, first English tragedy, in collaboration with Thomas Norton, 1561.<br>Edmund Spenser: *The Shepheardes Calendar*, 1579; *The Faerie Queene*, 1590-96.<br>John Lyly: *Euphues*, 1579; *Endymion*, 1591.<br>Sir Philip Sidney: *Defence of Poesie*, 1581; *Arcadia*, 1590; *Astrophel and Stella*, 1591.<br>Christopher Marlowe: *Tamburlaine*, 1587-90; *Doctor Faustus*, 1588; *Edward the Second*, 1592.<br>William Shakespeare: *Love's Labour's Lost*, 1590; *Richard III*, 1593; *The Merchant of Venice*, 1594-95; *Hamlet*, 1602; *Macbeth*, 1605-06; *The Tempest*, 1611.<br>Ben Jonson: *Every Man in His Humour*, 1596-98; *The Sad Shepherd*, 1637; lyrics.<br>Sir Francis Bacon: *Essays*, 1597.<br>Authorized Version of the Bible, 1611.<br>Sir Walter Raleigh: *History of the World*, 1614; poetry, travels. | Hans Sachs: poems, tales, dramas, 1523-73.<br><br>Camoens: the *Lusiad*, 1572.<br><br>Tasso: *Jerusalem Delivered*, 1574.<br>Montaigne: *Essays*, 1580, 1588.<br><br>Lope de Vega: poems, novels, plays, 1602-34.<br>Cervantes: *Don Quixote*, 1605, 1615. |

# ENGLISH LITERATURE

1625-1700

The cavalier poets: Thomas Carew, John Suckling, Richard Lovelace.

The religious poets: George Herbert, Francis Quarles, George Wither, Richard Crashaw, Henry Vaughan.

Abraham Cowley: *Poetical Blossoms,* 1633; *Pindarique Odes, The Davideis,* 1656.

John Milton: *Comus,* 1634; *Lycidas,* 1638; *Paradise Lost,* 1667; *Paradise Regained, Samson Agonistes,* 1671; sonnets, odes, essays.

John Evelyn: *Diary,* 1640-1704.

Robert Herrick: *Hesperides* and *Noble Numbers,* 1648.

Richard Baxter: *The Saints' Everlasting Rest,* 1650.

Jeremy Taylor: *Holy Living,* 1650; *Holy Dying,* 1651.

Thomas Hobbes: *Leviathan,* 1651; *Translation of the Iliad and the Odyssey,* 1675.

Izaak Walton: *The Compleat Angler,* 1653; biographical writings.

Samuel Pepys: *Diary,* 1660-69.

Samuel Butler: *Hudibras,* 1663, 1664, 1678.

Edmund Waller: *Poems,* 1664; *Divine Love,* 1685; *Fear of God,* 1686.

John Bunyan: *Grace Abounding,* 1666; *The Pilgrim's Progress,* 1678; *The Holy War,* 1682.

John Dryden: *Essay of Dramatic Poesy,* 1668; *Absalom and Achitophel,* 1681; *Alexander's Feast,* 1697.

William Wycherley: *The Gentleman Dancing Master,* 1671; *The Country Wife,* 1673.

John Locke: *Essay Concerning Human Understanding,* 1690.

William Congreve: *Love for Love,* 1695; *The Way of the World,* 1700.

Jeremy Collier: *Short View of the Profaneness and Immorality of the English Stage,* 1698.

1700-1800

Richard Steele: *The Christian Hero,* 1701; *The Tender Husband,* 1705; *Essays* in the *Tatler* (1709), *Spectator* and *Guardian* (1711-14).

Daniel Defoe: *Hymn to the Pillory,* 1703; *Robinson Crusoe,* 1719.

Joseph Addison: *The Campaign,* 1704; *Poems,* 1712; *Essays* in the *Tatler* (1709-11), *Spectator* (1711-14), *Guardian* (1713); political writings.

Jonathan Swift: *The Battle of the Books, A Tale of a Tub,* 1704; *Gulliver's Travels,* 1726.

Edward Hyde: *History of the Great Rebellion,* 1704-07.

Alexander Pope: *Essay on Criticism,* 1711; *Rape of the Lock,* 1712; *Essay on Man,* 1732-34.

John Gay: *The Shepherd's Week,* 1714; *Trivia,* 1715; *The Beggar's Opera,* 1728.

Allan Ramsay: *Scots Song,* 1719; *Poems,* 1721; *The Gentle Shepherd,* 1725; *Fables,* 1730.

James Thomson: *The Seasons,* 1726-30; *The Castle of Indolence,* 1748.

Samuel Johnson: *London,* 1738; *The Vanity of Human Wishes,* 1749; *The Rambler,* 1750-52; *Dictionary of the English Language,* 1755; *The Idler,* 1758-60; *Rasselas,* 1759; *Lives of the Poets,* 1779-81.

Samuel Richardson: *Pamela,* 1740; *Clarissa Harlowe,* 1748; *Sir Charles Grandison,* 1753.

Henry Fielding: *The Adventures of Joseph Andrews,* 1742; *History of Tom Jones,* 1749.

William Collins: *Persian Eclogues,* 1742; *Odes,* 1746, 1748, 1749.

Edward Young: *Night Thoughts,* 1742.

Mark Akenside: *Pleasures of the Imagination,* 1744; *Odes,* 1745.

Thomas Gray: *Odes,* 1747-48; *Elegy Written in a Country Churchyard,* 1751; *Pindaric Odes,* 1757.

Tobias Smollett: *Roderick Random,* 1748; *Peregrine Pickle,* 1751; *The Expedition of Humphrey Clinker,* 1771.

David Hume: *The History of England,* 1754-62; *The Natural History of Religion,* 1757.

Edmund Burke: *Vindication of Natural Society,* 1756; *On Conciliation with America,* 1775.

Laurence Sterne: *The Life of Tristam Shandy,* 1759-67; *Sentimental Journey Through France and Italy,* 1768.

Oliver Goldsmith: *The Citizen of the World,* 1760-61; *The Traveller,* 1764; *The Vicar of Wakefield,* 1766; *The Deserted Village,* 1770; *She Stoops to Conquer,* 1773.

James Macpherson: *Fragments of Ancient Poetry,* 1760; *Fingal,* 1762; *Temora,* 1763.

Thomas Chatterton: *Rowley Poems,* 1764-70.

Thomas Percy: *Reliques of Ancient English Poetry,* 1765.

Richard Sheridan: *The Rivals,* 1775; *The School for Scandal,* 1777; *The Stranger,* 1798.

Thomas Paine: *The American Crisis,* 1776; *The Age of Reason,* 1792-95.

Edward Gibbon: *Decline and Fall of the Roman Empire,* 1776-88.

William Cowper: *Olney Hymns,* 1779; *Truth,* 1782; *The Task,* 1785; *Translation of Homer,* 1791.

George Crabbe: *The Candidate,* 1780; *The Village,* 1783; *The Newspaper,* 1785.

William Blake: *Poetical Sketches,* 1783; *Songs of Innocence,* 1789; *Songs of Experience,* 1794.

James Boswell: *Journal of a Tour through the Hebrides,* 1785; *Life of Johnson,* 1791.

Robert Burns: *The Cotter's Saturday Night, To a Mouse, To a Daisy,* 1786; *Auld Lang Syne,* 1788; *To Mary in Heaven,* 1789; *Tam o'Shanter,* 1790; *Ye Banks and Braes,* 1792.

Ann Radcliffe: *The Mysteries of Udolpho,* 1794; *The Italian,* 1797.

| AMERICAN LITERATURE | FOREIGN LITERATURE |
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| **1625-1700** | |
| William Bradford: *History of Plymouth Plantation, 1602-47.* | |
| John Winthrop: *History of New England, 1630-49.* | Corneille: *Le Cid,* 1636. |
| *Bay Psalm Book,* 1640; produced under the supervision of Richard Mather, Thomas Welde and John Eliot. | |
| Nathaniel Ward: *Simple Cobbler of Aggawam,* 1647. | Descartes: *Principles of Philosophy,* 1644. |
| Anne Bradstreet: *Poems,* 1650. | |
| Michael Wigglesworth: *Day of Doom,* 1662. | |
| John Eliot: *Translation of the Bible* (into the Indian language), 1661-63. | Molière: *Tartuffe,* 1664; *The Misanthrope,* 1666; *L'Avare,* 1668. |
| | La Fontaine: *Fables,* 1668. |
| | Racine: *Iphigénie,* 1674; *Phèdre,* 1677; *Athalie,* 1691. |
| Cotton Mather: *The Ecclesiastical History of New England,* 1693-97. | Fénelon: *Télémaque,* 1699. |
| **1700-1800** | |
| | Le Sage: *Gil Blas,* 1715-35. |
| Benjamin Franklin: *Poor Richard's Almanac,* 1732-57; *Autobiography,* 1771, 1781, 1788. | Voltaire: *La Henriade,* 1724; *Zaïre,* 1732; *Candide,* 1757. |
| | Klopstock: *Der Messias,* 1748-73. |
| Jonathan Edwards: *Freedom of the Will,* 1754. | |
| Thomas Hutchinson: *History of Massachusetts Bay, 1628-1750,* 1760-67. | Rousseau: *La Nouvelle Héloïse,* 1760; *Contrat Social, Émile,* 1762. |
| James Otis: *The Rights of the Colonists Asserted and Proved,* 1764. | Wieland: *Translation of Shakespeare,* 1762-66; *Oberon,* 1780. |
| John Trumbull: *Progress of Dullness,* 1772-74; *M'Fingal,* 1774-82. | Lessing: *Laokoon,* 1766; *Minna von Barnhelm,* 1767; *Emilia Galotti,* 1772. |
| *The Federalist;* political essays written by Madison, Hamilton and Jay, 1787-88. | Goethe: *Sorrows of Werther,* 1774; *Wilhelm Meister, Part I,* 1795. |
| Joel Barlow: *The Vision of Columbus,* 1787; *The Hasty Pudding,* 1793. | Beaumarchais: *The Barber of Seville,* 1775; *The Marriage of Figaro,* 1784. |
| Timothy Dwight: *The Triumph of Infidelity,* 1788; *Greenfield Hill,* 1794. | Alfieri: *Cleopatra,* 1775; *Saul,* 1782. |
| Philip Freneau: *The Indian Burying-Ground, The Wild Honeysuckle, Eutaw Springs.* | Schiller: *The Robbers,* 1781; *Don Carlos,* 1787. |
| Joseph Hopkinson: *Hail Columbia,* 1798. | Saint-Pierre: *Paul and Virginia,* 1789. |

# ENGLISH LITERATURE

1800-1900

William Wordsworth: *Lyrical Ballads* (with Coleridge), 1798, 1800; *Michael,* 1800; *Sonnets,* 1802; *The Prelude,* 1895; *The Excursion,* 1814.

Samuel T. Coleridge: *The Ancient Mariner,* 1798; *Translation of Wallenstein,* 1800; *Ode to Dejection,* 1802; *Biographia Literaria,* 1817.

Maria Edgeworth: *Castle Rackrent,* 1800; *Leonora,* 1806; *Ormond,* 1817.

Robert Southey: *Thalaba,* 1801; *Madoc,* 1805; *The Curse of Kehama,* 1810; *Life of Nelson,* 1813.

Thomas Campbell: *Poems,* 1803; *Gertrude of Wyoming,* 1809.

Sir Walter Scott: *The Lay of the Last Minstrel,* 1805; *Marmion,* 1808; *The Lady of the Lake,* 1810; *Waverley,* 1814; *The Heart of Midlothian,* 1817; *Ivanhoe,* 1819; *Kenilworth,* 1821.

Lord Byron: *Hours of Idleness,* 1807; *Childe Harold's Pilgrimage,* 1812; *Manfred,* 1817; *Don Juan,* 1819-24.

Charles Lamb: *Tales from Shakespeare,* 1807; *Essays of Elia,* 1820-22, 1823.

Thomas Moore: *Irish Melodies,* 1807-34; *Lalla Rookh,* 1817.

Jane Austen: *Sense and Sensibility,* 1811; *Pride and Prejudice,* 1812; *Emma,* 1816; *Persuasion,* 1818.

Percy B. Shelley: *Queen Mab,* 1813; *Alastor,* 1816; *Prometheus Unbound,* 1820; *Adonais,* 1821.

John Keats: *Poems,* 1817; *Endymion,* 1818; *Lamia, The Eve of St. Agnes, and Other Poems,* 1820.

William Hazlitt: *English Poets,* 1818; *Dramatic Literature of the Age of Elizabeth,* 1821; *Life of Napoleon,* 1828-30.

Thomas De Quincey: *Confessions of an English Opium-Eater,* 1821; *Sketches of Life and Manners,* 1834-41.

Walter S. Landor: *Imaginary Conversations,* 1824-53; *Pericles and Aspasia,* 1836; *Pentameron,* 1837.

Thomas B. Macaulay: *Essay on Milton,* 1825; *Lays of Ancient Rome,* 1842; *History of England,* 1849-56.

Edward Bulwer Lytton: *Eugene Aram,* 1831; *The Last Days of Pompeii,* 1834; *Rienzi,* 1835; *My Novel,* 1853.

Alfred Tennyson: *The Palace of Art, The Lady of Shalott,* 1832; *The Princess,* 1847; *In Memoriam,* 1850; *Idylls of the King,* 1859-72; *Becket,* 1884; *Crossing the Bar,* 1889.

Thomas Carlyle: *Sartor Resartus,* 1833; *The French Revolution,* 1837; *Heroes and Hero Worship,* 1841.

Robert Browning: *Paracelsus,* 1834-35; *Pippa Passes,* 1841; *A Blot in the 'Scutcheon,* 1843; *The Ring and the Book,* 1868-69.

Charles Dickens: *The Pickwick Papers,* 1836-37; *Oliver Twist,* 1837-38; *Nicholas Nickleby,* 1838-39; *David Copperfield,* 1849-50; *A Tale of Two Cities,* 1859; *Our Mutual Friend,* 1864-65.

John H. Newman: *Tracts for the Time,* 1841; *Apologia pro Vita Sua,* 1864; *Verses,* 1868.

John Ruskin: *Modern Painters,* 1843-60; *Sesame and Lilies,* 1865; *Crown of Wild Olive,* 1866.

William M. Thackeray: *Vanity Fair,* 1846-48; *Henry Esmond,* 1852; *English Humorists,* 1853; *The Newcomes,* 1854-55.

Charlotte Brontë: *Jane Eyre,* 1847; *Shirley,* 1849; *Villette,* 1853; *The Professor,* 1857.

Charles Kingsley: *Alton Locke,* 1849; *Hypatia,* 1853; *Westward Ho,* 1855; *The Water Babies,* 1863.

Charles Reade: *Peg Woffington,* 1852; *The Cloister and the Hearth,* 1860; *Put Yourself in His Place,* 1870.

Anthony Trollope: *The Warden,* 1855; *Barchester Towers,* 1857; *Framley Parsonage,* 1861; *The Last Chronicle of Barset,* 1867.

Mathew Arnold: *Poems,* 1855; *On Translating Homer,* 1861; *Culture and Anarchy,* 1869; *Literature and Dogma,* 1873.

Elizabeth B. Browning: *Sonnets from the Portuguese,* 1856; *Aurora Leigh,* 1856; *Last Poems,* 1862.

George Eliot: *Scenes of Clerical Life,* 1858; *Adam Bede,* 1859; *Silas Marner,* 1861; *Romola,* 1863; *Middlemarch,* 1871-72.

George Meredith: *The Ordeal of Richard Feverel,* 1859; *The Egoist,* 1879; *Diana of the Crossways,* 1885.

Algernon C. Swinburne: *Atalanta in Calydon,* 1864; *Poems and Ballads,* 1866; *Essays and Studies,* 1875.

Dante G. Rossetti: *Poems,* 1870.

Thomas Hardy: *Far from the Madding Crowd,* 1874; *The Return of the Native,* 1878; *Tess of the D'Urbervilles,* 1891.

Robert L. Stevenson: *Treasure Island,* 1883; *Kidnapped,* 1886; *David Balfour,* 1893; *The Ebb Tide,* 1893.

Rudyard Kipling: *Plain Tales from the Hills,* 1887; *The Light that Failed,* 1891; *The Jungle Book,* 1894; *Kim,* 1901; *Rewards and Fairies,* 1910.

## AMERICAN LITERATURE

1800-1900

Charles B. Brown: *Arthur Mervyn* and other novels, 1799-1804.

Washington Irving: *Knickerbocker History of New York,* 1809; *Sketch Book,* 1819-20; biography and other prose.

William C. Bryant: *Thanatopsis,* 1817; *To a Waterfowl,* 1818; *The Ages,* 1821; addresses, essays.

James F. Cooper: *The Spy,* 1821; *Leather-Stocking Tales,* 1826-41.

Edgar A. Poe: *Tamerlane,* 1827; *The Raven,* 1845; tales.

John G. Whittier: *Legends of New England,* 1831; *Songs of Labor,* 1850; *Snow-Bound,* 1866.

Henry W. Longfellow: *Outre-Mer,* 1835; *Voices of the Night,* 1839; *Evangeline,* 1847; *Hiawatha,* 1855; *Miles Standish,* 1858; *Ultima Thule,* 1880.

George Bancroft: *History of the United States,* 1834-84.

Ralph W. Emerson: *Nature,* 1836; essays, poetry.

Oliver W. Holmes: *Poems,* 1836, 1846, 1850; *Autocrat* essays, 1857-90.

Nathaniel Hawthorne: *Twice-Told Tales,* 1837, 1842, 1852; *The Scarlet Letter,* 1850; *Tanglewood Tales,* 1853; *The Marble Fawn,* 1860.

William H. Prescott: *Reign of Ferdinand and Isabella,* 1838.

James R. Lowell: *A Year's Life,* 1841; *Biglow Papers, A Fable for Critics,* 1848; *Commemoration Ode,* 1865; *My Study Windows,* 1871.

Bayard Taylor: *Views Afoot,* 1846; *Translation of Faust,* 1870-71; poems.

Francis Parkman: *The Conspiracy of Pontiac,* 1851.

Harriet B. Stowe: *Uncle Tom's Cabin,* 1852.

Henry D. Thoreau: *Walden,* 1854; *The Maine Woods,* 1864.

Walt Whitman: *Leaves of Grass,* 1855; *Democratic Vistas,* 1870.

John Motley: *Rise of the Dutch Republic,* 1861.

Julia Ward Howe: *Battle Hymn of the Republic,* 1861.

Bret Harte: poetry and tales of the West, 1867-1901.

Mark Twain: *Innocents Abroad,* 1869; *Tom Sawyer,* 1876; *Huckleberry Finn,* 1885.

Thomas B. Aldrich: *Story of a Bad Boy,* 1870.

Joaquin Miller: *Songs of the Sierras,* 1871; *Songs of Italy,* 1878.

William D. Howells: *A Chance Acquaintance,* 1872; *A Modern Instance,* 1883; *The Rise of Silas Lapham,* 1885; poetry and criticism.

John Fiske: historical and philosophical writings, 1874-99.

Henry James: *Daisy Miller,* 1878; *The Bostonians,* 1886; essays.

Frank Stockton: *Rudder Grange,* 1879; *The Hundredth Man,* 1887.

George W. Cable: *Old Creole Days,* 1879; *The Grandissimes,* 1880.

Joel C. Harris: *Uncle Remus, His Songs and Sayings,* 1880.

Sidney Lanier: *The Science of English Verse,* 1881; poems.

F. Marion Crawford: *Dr. Claudius,* 1883; *Via Crucis,* 1899.

Eugene Field: *With Trumpet and Drum,* 1892; essays.

## FOREIGN LITERATURE

Schiller: *Maria Stuart,* 1800; *Wilhelm Tell,* 1804.

Chateaubriand: *Atala,* 1801; *René,* 1805.

Goethe: *Faust, Part I,* 1808; *Part II,* 1833.

Fouqué: *Undine,* 1811.

Grimm Brothers: *Fairy Tales,* 1812.

Uhland: *Fatherland Stories,* 1816.

Heine: *Gedichte,* 1822.

Tegnér: *Frithjof's Saga,* 1825.

Hugo: *Cromwell,* 1827; *Odes and Ballads,* 1829; *Hernani,* 1830; *Notre Dame,* 1831; *Les Miserables,* 1862.

Runeberg: *The Elk-Hunters,* 1832.

Balzac: *Eugénie Grandet,* 1833; *Père Goriot,* 1834.

Strauss: *Life of Jesus,* 1835.

Andersen: *Fairy Tales,* 1835.

Bremer: *The Neighbors,* 1837; *Hertha,* 1856.

Dumas: *Monte Cristo,* 1841-15; *The Three Musketeers,* 1844.

Sand: *Consuelo,* 1842.

Björnson: *Arne,* 1858; *Sigurd the Bastard,* 1862.

Turgeniev: *Fathers and Sons,* 1862.

Renan: *Life of Jesus,* 1863.

Taine: *History of English Literature,* 1864.

Braga: *Vision of the Ages,* 1864.

Tolstoy: *War and Peace,* 1864-69; *Anna Karenina,* 1873.

Dostoyevski: *Crime and Punishment,* 1866.

Frechette: *The Voice of an Exile,* 1869.

Verne: *Around the World in Eighty Days,* 1872.

Heyse: *Children of the World,* 1873.

Boyesen: *Gunnar,* 1874; *Idyls of Norway,* 1882.

Ibsen: *Pillars of Society,* 1877; *A Doll's House,* 1879; *Ghosts,* 1881.

Zola: *Nana,* 1880; *Le Rêve,* 1888.

Strindberg: *The New Kingdom,* 1882.

Halévy: *L'Abbé Constantin,* 1882.

Maupassant: *A Life,* 1883.

Daudet: *Sapho,* 1884.

Nietzsche: *Beyond Good and Evil,* 1886; *Poems and Aphorisms,* 1898.

Campbell: *Lake Lyrics and Other Poems,* 1889.

Du Maurier: *Peter Ibbetson,* 1891; *Trilby,* 1894.

Sudermann: *Dame Care,* 1892; *The Joy of Living,* 1902.

Hauptmann: *The Weavers,* 1892.

Sienkiewicz: *Quo Vadis,* 1895.

Parker: *The Seats of the Mighty,* 1896; *The Right of Way,* 1901.

Lagerlöf: *Miracles of Antikrist,* 1897.

Rostand: *Cyrano de Bergerac,* 1897; *L'Aiglon,* 1900; *Chantecler,* 1910.

Connor: *The Sky Pilot,* 1899; *The Doctor,* 1906.

# ENGLISH LITERATURE

1900

Sir Arthur Quiller-Couch: *The Oxford Book of English Verse,* 1900; *The White Wolf,* 1902; *News from the Duchy,* 1914.

Maurice Hewlett: *New Canterbury Tales,* 1901; *The Queen's Quair,* 1904; *The Half-way House,* 1908; *The Agonists,* 1911; *Bendish: A Study in Prodigality,* 1913.

Hall Caine: *The Eternal City,* 1901; *The Prodigal Son,* 1904; *The White Prophet,* 1909.

Henry A. Jones: *Chance the Idol,* 1902; *The Hypocrites,* 1907; *Mary Goes First,* 1914.

Arnold Bennett: *Anna of the Five Towns,* 1902; *The Old Wives' Tale,* 1908; *Clayhanger,* 1910; *The Price of Love,* 1914.

William B. Yeats: *Cathleen ni Hoolihan,* 1902; *In the Seven Woods,* 1903.

A. Conan Doyle: *The Hound of the Baskervilles,* 1902; *The Return of Sherlock Holmes,* 1905; *The Fires of Fate,* 1909; *The House of Temperley,* 1909; *The Lost World,* 1912.

Bernard Shaw: *Man and Superman,* 1903; *Misalliance,* 1910; *Fanny's First Play,* 1911; *Pygmalion,* 1912.

James Barrie: *Quality Street,* 1903; *Peter Pan,* 1904; *Alice Sit by the Fire,* 1905; *What Every Woman Knows,* 1908; *Peter and Wendy,* 1911; *The Legend of Leonora,* 1913.

Joseph Conrad: *Romance,* 1903; *The Mirror of the Sea,* 1906; *Under Western Eyes,* 1911; *Chance,* 1914.

Herbert G. Wells: *Mankind in the Making,* 1903; *A Modern Utopia,* 1905; *The War in the Air,* 1908; *Marriage,* 1912; *The World Set Free,* 1914.

Alfred Noyes: *The Flower of Old Japan,* 1903; *The Enchanted Island and Other Poems,* 1909.

Mrs. Humphry Ward: *Lady Rose's Daughter,* 1903; *Diana Mallory,* 1908; *The Case of Richard Meynell,* 1911; *The Coryston Family,* 1913; *Delia Blanchflower,* 1914.

Gilbert K. Chesterton: *Heretics,* 1905; *Dickens,* 1906; *The Man who was Thursday,* 1908; *The Innocence of Father Brown,* 1911; *Manalive,* 1912; *The Flying Inn,* 1914.

Edward V. Lucas: *A Wanderer in Holland,* 1905; *Over Bemerton's,* 1908; *Old Lamps for New,* 1911; *London Lavender,* 1912; *The Loiterer's Harvest,* 1913; *Landmarks,* 1914.

E. Temple Thurston: *The Apple of Eden,* 1905; *The Garden of Resurrection,* 1911; *The Antagonists,* 1912; *Richard Furlong,* 1913; *Achievement,* 1914.

William De Morgan: *Joseph Vance,* 1906; *Alice-for-Short,* 1907; *It Never Can Happen Again,* 1909; *When Ghost Meets Ghost,* 1913.

John Galsworthy: *The Silver Box,* 1906; *Joy,* 1907; *Strife,* 1909; *Fraternity,* 1909; *Justice,* 1910.

Anthony Hope Hawkins: *Tales of Two People,* 1907; *The Great Miss Driver,* 1908; *Mrs. Maxon Protests,* 1911.

Sir Arthur Pinero: *The Thunderbolt,* 1908; *Mid-Channel,* 1909.

Leonard Merrick: *Lynch's Daughter,* 1908; *A Daughter of the Philistines,* 1912.

Lady Gregory: *Spreading the News, The Rising of the Moon, The Workhouse Ward,* 1909; *The Kiltartan Wonder Book,* 1911.

John Masefield: *The Tragedy of Nan,* 1909; *The Story of a Round House and Other Poems,* 1912.

| AMERICAN LITERATURE | FOREIGN LITERATURE |
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| 1900 | |
| Irving Bacheller: *Eben Holden,* 1900; *Darrel of the Blessed Isles,* 1903; *Keeping Up With Lizzie,* 1911; *Charge It,* 1912; *The Turning of Griggsby,* 1913. | D'Annunzio: *The Flame of Life,* 1900; *Francesca da Rimini,* 1902. |
| Hamlin Garland: *The Eagle's Heart,* 1900; *The Long Trail,* 1907; *Victor Olnee's Discipline,* 1911. | Carman: *Last Songs from Vagabondia,* 1900. |
| Owen Wister: *The Virginian,* 1902; *Lady Baltimore,* 1906; *Members of the Family,* 1911. | Gorky: *The Peasant,* 1900. |
| Richard H. Davis: *Ranson's Folly,* 1902; *The Bar Sinister,* 1904; *The Lost Road,* 1913. | Ferrero: *The Greatness and Decline of Rome,* 1902. |
| Henry Van Dyke: *The Blue Flower,* 1902; *Collected Poems,* 1911. | |
| Thomas N. Page: *Gordon Keith,* 1903; *John Marvel, Assistant,* 1909; *The Land of the Spirit,* 1913. | France: *The Sign of the Reine Pedauque,* 1903. |
| Hamilton W. Mabie: *Backgrounds of Literature,* 1903; *American Ideals of Character and Life,* 1913. | |
| Kate Wiggin Riggs: *Rebecca of Sunnybrook Farm,* 1903; *Mother Carey's Chickens,* 1911. | |
| Jack London: *Call of the Wild,* 1903; *The Sea-Wolf,* 1904; *John Barleycorn,* 1913; *The Strength of the Strong,* 1914; *The Mutiny of the Elsinore,* 1914. | |
| F. Hopkinson Smith: *Col. Carter's Christmas,* 1904; *Peter,* 1908; *In Thackeray's London,* 1913. | |
| Edith Wharton: *The House of Mirth,* 1905; *The Reef,* 1912; *The Custom of the Country,* 1913. | |
| Winston Churchill: *Coniston,* 1906; *A Modern Chronicle,* 1910; *The Inside of the Cup,* 1913. | Fogazarro: *The Saint,* 1906. |
| Margaretta Deland: *The Awakening of Helena Richie,* 1906; *The Iron Woman,* 1911; *The Voice,* 1912; *Partners,* 1913. | |
| Mary Wilkins Freeman: *By the Light of the Soul,* 1907; *The Winning Lady,* 1909; *The Green Door,* 1910; *The Copy Cat and Other Stories,* 1914. | |
| James W. Riley: *The Little Orphant Annie Book,* 1907. | Roberts: *In the Deep of the Snow,* 1907. |
| Harold B. Wright: *The Shepherd of the Hills,* 1907; *The Winning of Barbara Worth,* 1912; *The Eyes of the World,* 1914. | Service: *Songs of a Sourdough,* 1907; *The Trail of '98,* 1910. |
| Frances H. Burnett: *The Shuttle,* 1907; *The Secret Garden,* 1909; *T. Tembarom,* 1913. | |
| John Fox, Jr.: *The Trail of the Lonesome Pine,* 1908; *The Heart of the Hills,* 1913. | Zangwill: *The Melting Pot,* 1908; *The War God,* 1911. |
| James Lane Allen: *The Bride of the Mistletoe,* 1909; *A Heroine in Bronze,* 1912. | Maeterlinck: *The Blue Bird,* 1909. |
| Ella W. Wilcox: *Poems of Progress and New Thought Pastels,* 1909; *Picked Poems,* 1912. | Bergson: *Time and Free Will,* 1910; *Creative Evolution,* 1911; *Dreams,* 1914. |
| William A. White: *A Certain Rich Man,* 1909. | Hopkins: *Life of King Edward VII,* 1910. |
| Kathleen Norris: *Mother,* 1911; *The Treasure,* 1914; *Saturday's Child,* 1914. | Tagore: *The Crescent Moon,* 1913; *The Gardener,* 1913; *The Realization of Life,* 1913. |

**Lith'ium,** a widely distributed element found in mica, feldspar, mineral and sea waters and in some plants, notably the tobacco and the beet. It is a silver-white metal, easily distinguished by the bright crimson flame which it produces. Lithium carbonate is especially noted for its power to dissolve uric acid, and mineral springs containing this salt are frequently recommended to persons suffering from gout and rheumatism.

**Lithography,** *Li thog' ra fy,* the art of printing from prepared stones. The stone employed is known as a lithograph stone, and is a fine-grained limestone of a very porous nature, having usually a light gray color. The best stones are obtained in Bavaria, where the art was invented in 1796 by Senefelder. These limestones absorb grease and water rapidly; therefore, if a line is drawn on a prepared stone with an ink containing grease, this line can be taken away only by removing the surface to the depth to which the grease has penetrated. If water is now placed on this stone, the water will remain only on those parts not covered by the grease. When a roller carrying a greasy ink is passed over the stone, the ink will cover only the greased portions, and the parts that are wet will not take up the ink. A piece of paper pressed upon the stone will receive an impression in ink from the lines drawn. On these principles depend lithography. Aluminum plates and those made of an alloy of zinc are frequently substituted for lithograph stones. See ENGRAVING; ZINC ETCHING.

CHROMOLITHOGRAPHY, or COLOR PRINTING. This is the process of making plates and producing pictures in the natural or selected colors of the object to be printed, and differs from lithography in the use of a separate plate or stone for each color produced. A press operated either by hand or by power is used, differing but little from the ordinary printing press. Maps and the reproduction of art pictures, and the different classes of work wherein a large duplication is required, render lithography and chomolithography valuable, but the cheaper processes of zinc etching and photo-engraving have largely supplanted it in commercial work.

**Lit'mus,** a coloring matter obtained from certain lichens by exposing them to the air in the presence of ammonia and potassium carbonate. Its coloring principle is a red acid, but the color of its salts is blue. Litmus is sold in the market as a lumpy, blue powder. Aside from its use as a dye, it is used in the laboratory to detect the presence of acids or alkalies; any acid turns litmus red, and any alkali restores the blue color. For this purpose litmus is sold as a liquid or as "litmus paper," which is an unglazed paper treated with liquid litmus.

**Little Falls, N. Y.,** a city of Herkimer Co., 21 m. s.e. of Utica, not far from Schenectady, on both sides of the Mohawk River, on the Erie Canal and on the New York Central & Hudson River, the West Shore and other railroads. Excellent water power has contributed to the development of the city as a manufacturing center. Its products include knit goods, paper, leather, felt shoes, bookcases, dairy machinery and other articles. In June, 1782, the town was destroyed by the Indians and Tories, and the place was not resettled until 1790. Population in 1910, 12,273.

**Little Rock, Ark.,** the capital of the state and the county seat of Pulaski Co., situated in the central part of the state, on the Arkansas River and on the St. Louis, Iron Mountain & Southern, the Chicago, Rock Island & Pacific, the St. Louis Southwestern and other railroads, about 350 m. n. of New Orleans. Little Rock is situated upon a high rocky bluff overlooking the river and is surrounded by the foothills of the Ozarks. The city itself is on a comparatively level situation fully 50 ft. above the river, which is here crossed by several bridges. The city has 40 m. of paved streets and 35 m. of street-car lines. An excellent park system includes within the city Forest Park, City Park, West End Park and Wonderland; aside from these there are many attractive natural parks along the river. Little Rock has many state insti-

tutions with excellent buildings and spacious grounds. Among these may be mentioned the state capitol, a fine city building, the state asylum for the insane, the state deaf-mute institute, the state school for the blind, a state reform school, the penitentiary, a new courthouse and the state library. Aside from these there is a Carnegie library, built in 1908, the Old Ladies' Home, Florence Crittenton Rescue Mission, a United States arsenal, St. Vincent's Infirmary, a Masonic Temple, a Y. M. C. A. Building, several hospitals, one of which is especially for the treatment of nervous diseases, a children's home and a courthouse for the Federal District Court.

Little Rock has one of the finest public school systems in the Southwest, with an investment of more than $1,000,000 in buildings and equipment, and a school enrollment which reaches 8000. In addition to public schools the law and medical departments of the state university are located here, as well as Little Rock College, St. Mary's Academy, Philander Smith College, Arkansas Baptist College and the Supreme Court and Collegiate libraries.

Cotton and lumber furnish the products for the chief industries; cottonseed oil and cake and planing-mill products are exported in large quantities. Printing and publishing, furniture manufacture and machine making come next in importance, and just recently packing houses and stockyards have been established. Valuable deposits of bauxite occur in the county, and Little Rock is the shipping point for the ore. Little Rock was originally an Indian settlement. White people first settled there in 1814. In 1821 the town was incorporated and it became the capital of Arkansas in 1836. In the Civil War the city was Confederate in its sympathies, and its United States arsenal was seized by the state. Later the city was taken by Federal authorities and remained in their hands until the close of the war. Little Rock had the first newspaper published west of the Mississippi. Population in 1910, 45,941.

**Live-Forever.** See HOUSELEEK.

**Liv'er,** a large glandular organ in the body of the Vertebrates. In man it is situated in the upper part of the abdominal cavity immediately below the diaphragm, and lies rather more to the right than to the left. It is of irregular shape, generally flat, broad and thicker on the right side. Its weight is about four pounds. The lower end is divided into five lobes, two large and three small (minor) lobes, and its upper surface is arched and fits into the concave underside of the diaphragm. The liver is of a soft and easily crumbled material, and is dark reddish-brown in color. Its function is important. It secretes the bile necessary for digestion (See BILE); it receives all the blood from the stomach and intestines; destroys the worn-out red corpuscles (see BLOOD); and takes from the blood its excess of sugar and stores it away in the form of starch, called glycogen. Bile is carried from the liver through the hepatic duct to the gall bladder, a small, elongated sac, on the underside of the liver, where it is kept in storage to be poured out through the hepatic and cystic ducts into a common bile duct, which empties it into the duodenum during the process of digestion. Arterial blood, which nourishes the liver, is carried to it from the aorta through the hepatic artery. Venous blood from the stomach, intestines, pancreas and spleen, from which it takes certain impurities, is carried to the liver through the portal vein, and carried from it through the hepatic veins and inferior vena cava to the heart. In the absence of food the store of glycogen is the first to be drawn upon to furnish the fuel supply of the body. See DIGESTION.

**Liv'ermore, Mary Ashton Rice** (1821-1905), an American lecturer and reformer, born in Boston, daughter of Timothy Rice. She was educated at the Charlestown Female Seminary, taught school, and married Rev. D. P. Livermore, a Universalist minister and anti-slavery lecturer. During the Civil War Mrs. Livermore became the Northwestern agent of the United States Sanitary

Commission. She was active in the anti-slavery, temperance and women's suffrage movements. In 1870-71 she was editor of the *Woman's Journal* of Boston, and was for many years president of the Massachusetts Woman's Christian Temperance Union. She was a popular lecturer and the author of several books.

**Liv'erpool,** a city and seaport of England, situated on the right bank of the estuary of the Mersey, about 3 m. from the open sea and 201 m. by rail n.w. of London. It is the second city of England and the third of the United Kingdom. The climate is healthful, and the portions of the city that are built on the highlands back from the low quarters along the river are attractive. It extends in a semicircle along the bend of the Mersey, the docks and wharves stretching out several miles.

Streets, Parks and Public Buildings. The streets lead from the water front up the slopes to a height of 250 ft. They are lined with attractive buildings, built chiefly of stone, and some of the handsome stores, general public edifices and palatial offices are among the finest in the world. The parks include the Wavertree (with which are connected the botanic gardens), Calderstones, Newsham, Sheil and Stanley, an area in all of about 100 acres. One of the finest buildings is St. George's Hall, a combination of a hall for the triennial music festivals, and law courts for the assizes. In its spacious audience room is one of the largest organs in the world. Among other buildings are the New Law Courts, the Free Library and Museum, the Walker Fine Art Gallery, several theaters, the Philharmonic Hall, the Picton Lecture Hall, the Exchange, the revenue buildings, the post office, the Royal Institution, the Liverpool University, St. Francis Xavier's College and several technical and art schools. Liverpool was the first city in England to maintain municipal baths, adopting the system in 1794. The establishments are well equipped and over 1,000,000 of the inhabitants patronize them.

Commerce and Industries. The docks of Liverpool, a striking feature, are owned by the Mersey Docks and Harbor Board. They contain over 24 m. of wharfage. The great landing stage, known as the George's stage and the Prince's stage, supported on floating pontoons and connected by bridges with the river wall, is 2487 ft. in length and 80 ft. in breadth. The foreign trade of Liverpool is large, especially the intercourse with North America. Its fleet of merchant vessels is larger than that of any other seaport. The leading import is cotton. Next follow grain, flour, tobacco, cattle, timber, raw sugar, wool and leather. Iron and steel manufactures, pig iron, machinery and cotton goods are exported. The industries are represented by large shipbuilding yards, engineering works, pottery and china manufactures, sugar refineries, confectionery works, oil-pressing and cattle-cake mills, iron and brass foundries, corn mills and breweries.

Government and History. The city returns nine members to Parliament, is divided into 16 districts or 35 wards and has 103 councilors and 34 aldermen. There were colonies of Norsemen on both sides of the Mersey River in the eighth century. Liverpool received a charter of incorporation in 1229. A century later the black death, passing over the city, caused a large decrease in population, and there was no material advancement in the growth before 1600. After the Restoration the commerce developed rapidly with the growth of the manufacturing industries of south Lancashire and the beginning of trade with the West Indies and America. By 1730 the city was actively engaged in the slave trade, profiting by its proceeds as well as by that of privateering. In 1830 the first important steam railroad in the world went into operation between Liverpool and Manchester. Population, 685,000.

**Liv'erworts",** a class of flowerless plants related to the mosses but differing from them in their method of reproduction. In general they are leaflike plants

growing in moist, swampy situations or in the water. They are characterized by having flat bodies which, unlike those of lower forms of plants, have distinct upper and lower surfaces and well-marked bases and apexes; the latter form the growing point of the plant and the former produce a cluster of rootlike appendages often from one to two inches in length. Some of the liverworts produce, near the so-called midrib of the plant, a stalked fruiting body, bearing the spores by which the plant is reproduced. Other liverworts reproduce by the formation of an egglike body, containing spores which, in time, grow into plants like the parent lichen.

The liverworts were so named because their lobed bodies, generally brown in color, were supposed to resemble the human liver. They must not be confused with the flowering plant hepatica, or liverwort, of the Crowfoot Family, which also received its name from its liverlike, three-lobed leaf.

**Liv'ingston, Robert R.** (1746-1813), an American statesman, born in New York City and educated at King's College (now Columbia). He was admitted to the bar in 1773 and attained great success in his profession. Elected to the Continental Congress, he was chosen one of the committee of five to draw up a declaration of independence. In 1777 Livingston assisted in framing the constitution of New York State, and became chancellor of New York, an office which he held until 1801, and by virtue of which he administered the oath of office to George Washington when he was inaugurated first president of the United States. In 1781-83 Livingston was secretary of foreign affairs. He was in favor of the Federal Constitution and took an active part in securing its ratification by the New York State Convention in 1788. In 1801 he became minister to France, and acted with James Madison in negotiating the purchase of Louisiana in 1803. Later he traveled extensively in Europe, where he met Robert Fulton, whom he assisted in his experiments with steam navigation. He was the principal founder of the American Academy of Fine Arts in Boston, and was its first president. Benjamin Franklin called him the "Cicero of America."

**Livingstone, David** (1813-1873), an African traveler and missionary, born at Blantyre, in Lanarkshire, Scotland. At ten he entered a cotton factory, where he worked hard for years; but he managed to acquire a knowledge of Latin and Greek, besides pursuing a course of medicine at Glasgow University and attending some theological lectures of the Scotch Independents. Thereupon he offered himself to the London Missionary Society, by which he was ordained medical missionary in 1840. That summer he landed at Port Natal, South Africa. Here he became acquainted with Robert Moffat, with whom he was associated for nine years and whose daughter he married. Livingstone learned from the natives that there was a large lake to the north of the Kalahari Desert, and, exploring the region, discovered Lake Ngami in August, 1849. Three years later he explored the upper lakes of the Zambesi River and crossed the continent to Loanda, consuming about 18 months in the journey. In September, 1854, he left Loanda for his return across the continent, arrived safely at Linyante and proceeded thence along the Zambesi to the Indian Ocean, which he reached May 20, 1856. He then returned to England, where he was enthusiastically received. In 1857 he published his *Missionary Travels and Researches in South Africa.*

The following year, while commanding an exploring expedition in eastern and central Africa, Livingstone discovered lakes Shirwa and Nyassa. In 1865 he revisted the interior of Africa, and from then until his death zealously explored, mainly to the west of Nyassa and Tanganyika, where he discovered lakes Mweru and Bangweolo. For three years he was cut off from communication with the outside world, and fears for his safety were not set at rest until it was known that in November, 1871,

he had been visited at Ujiji by Henry M. Stanley of the New York *Herald*. After four months' companionship, Stanley proceeded to Zanzibar, and Livingstone went to the southern end of Lake Tanganyika; but, after wandering about for another year, he died near Lake Bangweolo. He was buried in Westminster Abbey. Besides the account of his missionary travels and researches, he wrote *The Zambesi and Its Tributaries*. Consult Stanley's *How I Found Livingstone* and Hughes's *David Livingstone*.

**Liv'y** (Titus Livius) (59 B. C.-A. D. 17), a Roman historian, born at Patavium, in Venetia. He lived chiefly in Rome, and between B. C. 29 and 25 he began to write his extensive history of Rome, the plan of which allowed for 142 volumes. Only 35 of these are extant. He was not always accurate in his statements; nor was he critical. In the preface to the stupendous work he outlines his plan to record the history of the Roman people from the beginning, the nation that was "the first in the world." Therefore, he is not concerned with writing for students, nor with intensive investigations, but in a charming style he records the passing glories of Rome, and with a patriot's zeal turns from the evils of his own day and dwells on the great lessons of the past.

**Liz'ard,** an order of Reptiles comprising many families and varying widely in habits and structure. There are tiny, wormlike lizards which have no visible limbs and, from superficial observation alone, would be classed among the snakes, and there are large, powerful animals which rival the crocodiles in size. Their peculiar characteristics are: a long body, generally flattened; a protruding head; eyes that have movable eyelids or, rarely, are protected by a thin fold of skin; a distinct neck; and four sprawling limbs which generally have five long claws. Their food consists of insects which are caught by means of a more or less cleft tongue that can be extended to a length often exceeding that of the reptile itself.

The tail of the lizard is probably its most interesting feature. It is frequently a strong and powerful member and generally of great length. In some species it is the storehouse of extra nourishment taken up by the animal. In all species, however, the lizard seems to have the peculiar power of detaching it in time of danger. After such a method of self-preservation the lizard retires to the crevice of a rock from which it issues, in the course of a few months, with a new tail, which, though shorter and less powerful than its previous one, is nevertheless equally efficacious in preserving its owner from capture.

The lizards generally reproduce by means of eggs but in a few species the young are born alive. Some, too, as the chameleon, have the power of changing the color of their coats.

Lizards are distributed throughout all parts of the temperate and tropical zones but are most common in the warmer countries. They comprise one of the largest classes of Reptiles. See Basilisk; Chameleon; Gila Monster; Glass Snake; Horned Toad; Iguana; Skink; Gecko.

**Llama,** *Lah' ma,* a South American member of the Camel Family, often called the American camel. It is smaller and less strong than its desert kin, has no hump and is particularly distinguished for its parted hoof, which renders it sure footed upon mountain paths. The males have long been used by the South American Indians as burden-bearers, but they are particular animals and insist upon grazing as they go and refuse to travel if the load be too heavy; when resting they make a peculiar humming noise like the note of a bee. The females furnish milk and meat. The Indians are fond of their llamas, decorating them with ribbons or bells and offering humble apologies if the load is large. The use of mules, horses and railroads in South America has driven the llama up the Andes, where it continues to be the surest means of transportation.

**Llanos,** *Lah' nos,* a local name for the treeless plains or prairies of South America. Specifically the term applies

to a level area in Venezuela and Colombia between the outlying spurs of the Andes on the west and the Orinoco on the east. This region is about 150,000 sq. m. in extent and lies only a few hundred feet above sea level. The lower portions, extended to the forested areas of the Amazon, are flat and subject to inundation during the rainy season, and they produce an abundant growth of grass; while the upper llanos are broken by undulations of low hills. The climate is hot and moist, and parts of the region are malarial.

**Lloyd-George, David** (1863- ), a British statesman, born at Manchester. He was educated in Wales, became a solicitor in 1884 and entered Parliament for Carnarvon Boroughs in 1890. Acquiring a reputation as a leader of the Radicals, he rapidly gained prominence, and after the victory of the Liberals in 1906, he was chosen president of the Board of Trade. In this capacity he distinguished himself by settling the cotton workers' strike, wherein 300,000 persons were involved, and in averting the threatened railway strike. When Mr. Asquith became premier in 1908, Mr. Lloyd-George was made chancellor of the exchequer. As such, he created considerable excitement by his financial budget for 1909-1910, which contained many radical tax measures and was refused by the House of Lords, but afterwards accepted in modified form. Mr. Lloyd-George is prominently identified with the movement for social and industrial reform now in progress in England.

**Lloyd's,** a British association, incorporated in 1871, which includes merchants, shipowners and ship brokers, insurance brokers and underwriters. Its headquarters are in the Royal Exchange, London, but throughout the world it maintains a marvelously efficient intelligence department which collects information of the greatest importance to all maritime interests. It has its own signal stations and telegraph lines, and since 1896, the masters of all British ships are required to notify Lloyd's concerning every derelict vessel sighted. This and other valuable information is published by the association, which issues a daily, *Lloyd's List,* the oldest London paper except the *Gazette. Lloyd's Register,* an annual publication, is a storehouse of information concerning the classification of ships, their construction, age, equipment, condition, etc. Lloyd's had its origin as early as 1688 in the natural gathering of merchants and shipowners at a coffeehouse owned by Edward Lloyd. It is now one of the world's most powerful commercial associations. By a simple method, various members unite to insure this, or that, vessel, depositing with the association approved securities to guarantee the performance of such obligations.

**Loadstone,** or **Lodestone.** See MAGNET.

**Loam,** *Lome.* See SOIL.

**Loan and Trust Companies.** See BANKS AND BANKING.

**Lobe'lia,** a name applied to a number of plants of the Lobelia Family, all of which are of value medicinally. They are coarse herbs or shrubs, growing in warm or temperate climes. There are many in the United States, growing in damp woodlands and easily distinguished by their straight stems, bitter, milky juice, wavy-margined, oval leaves and spikes of inconspicuous, but bright-colored, flowers. Most of the lobelias have a sickening odor, and from the leaves and tops a drug is procured, which is used as an emetic, cough remedy and preventive of spasms. The various lobelias are locally known as Indian tobacco, asthma weed, red-Betty, cardinal flower and bladder pot.

**Lob'ster,** a name given to a family of Crustaceans familiar everywhere through their use as food. The commonest-known species live in the sea and make their retreats in crevices of submerged rocks, from which only the heads and claws project. A living lobster is generally of dark color and attains its familar brilliant hue only after being boiled. The body is made up of two divisions, the cephalothorax, or union of

head and thorax, and the abdomen. The cephalothorax bears the mouth and the appendages, one pair of which is greatly enlarged and so divided at its extremity that it forms a huge, crushing claw. Two pairs of appendages are antennæ, or feelers. The stiff, horny shell of the cephalothorax covers the folds of the gills and extends out in such a manner that the head and all the appendages may be retracted beneath it. The eyes, of which there is but one pair, are large and compound, and are so situated upon movable stalks that they give the lobster a wide range of vision. The abdomen is terminated by an incurved tail which may be straightened and curved to aid in swimming.

Lobsters are hatched from eggs, which are carried about by the mother on small, rudimentary appendages called swimmerets. For five or six months the immature lobsters swim about near the shore and then return to the sea. The shell of the lobster is not of living tissue and does not increase in size as the animal grows; hence it must be cast aside when too small to be protective. This process, known as ecdysis, occurs in some cases 14 or 15 times during the first year, three or four times during the fourth year and only rarely after that, although lobsters often attain an age of 15 or 20 years. The process is painful and consists of a slow splitting of the shell and a gradual slipping out from it by awkward contortions. For several weeks after, the lobster is in a fairly helpless condition until the new shell grows. Lobsters, like crabs, are able to renew any lost appendages, but frequently the new one is more rudimentary than its predecessor.

Lobsters are in constant demand as an article of food, and the lobster fisheries, which are confined to the Atlantic coast, rank fifth in value among the fisheries of the country. The largest reported lobster caught was nearly two feet long and weighed 34 pounds. See CRUSTACEA; SHRIMP. An authoritative work is Herrick's *The American Lobster.*

**Lobworm.** See LUGWORM.

**Local Option,** a political term meaning the right of local choice and applied only to the question of licensing or prohibiting the sale of intoxicating liquors. Many states have local option laws which allow a village, city, town or county to decide by popular vote whether or not intoxicating liquors shall be sold within their boundaries, and, if sold, under what restrictions, though these restrictions must conform to the state laws.

**Lock,** a mechanical contrivance for fastening doors, trunks, boxes and similar objects. The essential parts of a common lock are the bolt, the staple, into which the bolt is thrown, and the spring, which prevents the bolt from being thrown without the key. The bolt is usually provided with one or more pieces of steel attached to it by a pivot and containing notches. These are known as tumblers, and they prevent the lock from being operated by any key except that made especially for it. Projections on the keyhole, called guards, prevent any key, except the one fitted to the lock, from being inserted. The Yale lock, so named from its inventor, contains a series of pin tumblers, each of which prevents the bolt from being thrown. It is worked with a thin key about two inches long, with an irregular series of notches on each edge and one or more grooves on the sides. Each notch fits a tumbler, and it is almost impossible to work the lock with any key except that made especially for it. See SAFE.

**Lock** (Canal). See CANAL.

**Locke,** *Lock,* **John** (1632-1704), a distinguished English philosopher, born at Wrington, near Bristol. His father was an attorney and served in the Parliamentary army during the Civil War. Locke graduated at Oxford in 1656, and lectured there on Greek, rhetoric and moral philosophy from 1661 to 1664. Next year he went to Cleves as secretary to the British envoy; but soon returned to Oxford to study medicine, and in 1666 became physician in the family of Lord Ashley, afterwards Earl of Shaftesbury, under whose patronage he held various offices. He drew up a noted

constitution, known as the Grand Model, for the Carolinas, of which Shaftesbury was one of the proprietors; but it was never adopted because its terms were not fitted for a new country. He followed the Earl in his forced retirement to Holland in 1682, where he remained until 1688. In 1695 he became member of a new council of trade, with a salary of £1000.

In 1687, while in Holland, Locke finished his great *Essay Concerning Human Understanding,* on which he had been working for 17 years. It was published in London in 1690 and attained immediate celebrity. In this essay Locke is the founder of the realistic school of philosophy and the father of modern materialism. He deals wholly with the limits of human thinking and comes to two conclusions: first (negatively), there are no innate ideas; second (positively), all our knowledge originates in experience. At birth the mind is a blank (*tabula rasa*) upon which experience writes ideas. Experience itself is twofold: either it arises through the perception of external objects by means of the senses (sensation); or it is the perception of the activities of our own understanding (reflection). Sensation and reflection are thus the two windows through which alone the light of ideas falls upon the original void of the mind. This philosophy of Locke exercised great influence upon the development of English thought.

**Lock'hart, John Gibson** (1794-1854), a Scottish author, born in Lanarkshire. He contributed to *Blackwood's Magazine* several brilliant criticisms as well as translations of Spanish ballads. In 1820 he married the daughter of Sir Walter Scott. In 1825 he became editor of the *Quarterly Review.* His *Life of Walter Scott* is an admirable biography, ranking a close second to Boswell's *Johnson.* He also wrote a life of Burns and one of Napoleon, as well as a few novels which lack distinct merit.

**Lock Haven, Pa.,** county seat of Clinton Co., 25 m. s. w. of Williamsport, on the West Branch of the Susquehanna River at the mouth of Bald Eagle Creek, on the Pennsylvania Canal and on the New York Central & Hudson River and the Pennsylvania railroads. Pine lumber is the chief export. The Central State Normal School is located here, and also a hospital and a fine courthouse. The industrial establishments include planing mills, tanneries, foundries, fire-brick and sewer-pipe works and manufactories of paper, cigars, furniture, silk and other articles. Lock Haven was settled in 1769. It was incorporated as a borough in 1844 and as a city in 1870. Population in 1910, 7772.

**Lockjaw.** See TET'ANUS.

**Lock'outs.** See STRIKES AND LOCKOUTS.

**Lockport, N. Y.,** county seat of Niagara Co., 26 m. n. e. of Buffalo, on the Erie Canal and on the New York Central & Hudson River and Erie railroads. The canal descends here about 60 ft. from the level of Lake Erie to the Genesee level by five locks of massive masonry, and passes through a channel cut in solid limestone several miles in extent. Lockport has important industrial establishments, which include iron foundries, machine shops, pumping-machinery works, and pulp, paper, rolling and fiber mills. Population in 1910, 17,970. See ERIE CANAL.

**Loco-Focos,** *Lo" ko-Fo' coze,* the radical faction of the Democratic Party in 1835, originating in New York, though the name was afterward national. While the Federalists were in control of the government their method of granting bank charters and controlling banks caused them to be charged by the opposing party with favoritism. When the Democrats gained control, things did not improve in the opinion of many, and a party was formed opposed to special bank legislation. At a meeting held in Tammany Hall, Oct. 29, 1835, the regular Democrats tried to gain control. Finding themselves unable to do so, they turned out the lights and retired. The other faction quickly produced candles and a kind of match called a loco-foco match, and the meeting continued; hence the name Loco-Foco. The new party

adopted the name Equal Rights in January, 1836.

**Lo"como'tive,** an engine mounted on wheels and capable of propelling itself. When used without qualification, the term means a railway engine. Locomotives are propelled by steam, by compressed air, by gas and by electricity. The essential parts of a steam locomotive are the boiler, the frame, the engine, and the wheels, upon which it is mounted. The boiler is horizontal, and in the largest locomotives is about 7½ ft. in diameter and about 45 ft. long. The fire box is at the rear end and a little below the boiler, and a large number of tubes extend through the boiler and greatly increase the heating surface. When filled with water, a boiler of this size weighs about 80 tons (See BOILER). The fire box necessary to supply a boiler of this size with heat must be at least 10 by 9 ft., and the heating surface must exceed 6225 sq. ft.

The boiler is mounted on the frame, which rests upon the wheels. Some parts of the engine, as the cylinders, are made a part of the boiler, while other parts are attached to the frame and the wheels. The locomotive is really a double engine having one engine on each side (See STEAM ENGINE). The wheels consist of drive wheels and trucks. The former are large wheels to which the power is applied. They vary in number according to the pattern of the locomotive and the purpose for which it is designed. The ordinary high-speed passenger locomotive has four or six drive wheels, usually about 6 ft. in diameter. These are joined by a bar so that power is applied to all equally and the maximum hauling power of the locomotive secured. In freight locomotives there may be eight or ten drive wheels. In the case of the latter number no trucks are required. The drive wheels on a freight locomotive are smaller than those on one designed for passenger service. Here speed is sacrificed for power.

The number of trucks depends upon the type of locomotive. The type with four or six drive wheels has four trucks in front. These are mounted in a frame, which is attached to the frame of the locomotive by a swivel. This pattern of truck is called a bogie, and it enables the locomotive to run on a curve as well as on a straight track. A locomotive with eight drivers usually has one pair of trucks in front, and those with ten drivers have none or one. The bicycle type, which has only one pair of drivers, has four trucks on a bogie in front and one pair of the drivers.

The frame to which the other parts of the locomotive are attached is made of cast iron and steel and is of great strength. At the rear end of the boiler is a cab for the engineer and fireman. In this are all the attachments for controlling the locomotive. These include the throttle, the reversing lever, the air-brake lever, the steam gauge and numerous other minor attachments. On top of the boiler are the steam dome, the sand dome, the whistle, the bell and the smokestack. Attached to the locomotive is a tender, which is a car for carrying the water and fuel. The tender is rectangular in form and mounted on two bogies. The tank usually surrounds the fuel box on three sides. The largest tanks hold about 12,000 gallons of water; the smaller ones, about 5000 gallons. The tender carries from 10 to 14 tons of coal. If crude petroleum is employed for fuel, it carries about 4000 gallons.

Nearly all modern locomotives are of the compound type; that is, they have four cylinders, two for high-pressure steam and two for low-pressure. These cylinders are located on each side of the locomotive, one above the other. The high-pressure cylinder, being the smaller, is above the low-pressure cylinder. This construction allows a larger percentage of the steam power to be used. A steam pressure of 200 lb. to the square inch can be maintained, and the tractive, or hauling, power of the locomotive is determined by multiplying the square of the diameter of the cylinder by the length of stroke, and this product by the pressure, and dividing the entire product by the diameter of the drive wheels. If the cylinder has a diameter of 16 inches, a

stroke of 20 inches, and the steam pressure is 200 lb. and the diameter of the drive wheels 72 inches, the tractive power would equal $\frac{16^2 \times 20 \times 200 \text{ lb.}}{72}$, or 14,222 lb., or about 7¼ tons. This, of course, is an estimate for a very small locomotive. The most powerful engines will haul a load of 7500 tons at a speed of 10 m. per hour on a level track. Passenger locomotives built for speed often average over 60 m. per hour, and where conditions are favorable they occasionally exceed 100 m. an hour for short distances. The heaviest locomotive ever constructed weighs 616,000 lb. and the next in weight is 540,000 lb. These engines have ten drive wheels on each side and are used as pushers on heavy grades in the mountains. In 1912 there were over 65,000 locomotives in the United States, and the manufacture and repair of locomotives is an industry of great importance. Aside from the manufactories connected directly with the great railroads, there are large locomotive works at Philadelphia, Paterson, N. J., and in other cities.

History. The early history of the locomotive is inseparable from that of the steam road wagon (See Automobile, subhead *History*). The first successful railway locomotive was the *Rocket,* constructed by George Stephenson of England and placed on the Liverpool & Manchester Railway in 1829. The *Rocket* weighed over four tons and was able to travel from 16 to 20 m. an hour. The first locomotives used in the United States were brought from England. In 1830 Peter Cooper of New York built a small locomotive having an upright boiler. It weighed less than a ton but was successful. In 1832 Mathias Baldwin built *Old Iron Sides,* and this was the beginning of locomotive construction in the country. Mr. Baldwin founded the Baldwin Locomotive Works, which has become one of the largest establishments of its kind in the world. The modern locomotive has been developed from these early English and American types. See Railroad. Consult Reagan, *Locomotives: Simple, Compound and Electric.*

**Locomotive, Electric,** a locomotive in which electricity is used as the motive power. The electric locomotive is the development of the motor used on electric cars, and operates on the same principle (See Electric Motor; Electric Railway). The electric locomotives used on steam railways are as powerful as the steam locomotives which they replace, and are employed in tunnels and, in New York and some other cities, to haul trains from the city limits to their terminals. Their use does away with the smoke and gases given off by the ordinary locomotive.

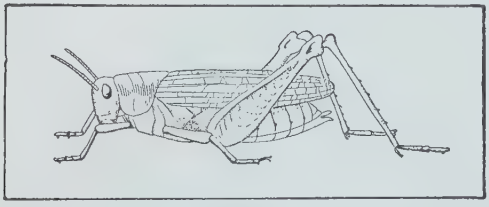
**Lo"como'tor Atax'ia,** a disease of the nervous system, marked by loss of muscular control. It is sometimes accompanied by partial paralysis. It is not the result of muscular weakness, but of lack of harmonious and proper action. The earlier symptoms are impaired vision, pains in the limbs and constitutional disturbances. The progress of the disease is slow. In the later stages the patient has great difficulty in walking; he moves with short halting steps and sometimes falls. The disease is incurable and usually lasts several years.

**Loco Weed,** a weed of the Pulse, or Pea, Family, common on Western plains and much feared because of its harmful effect upon cattle. The stems of all species are erect and have small leaflets arranged along a general leafstalk much like those of the common vetch. The flowers, which are tubular and may be white, purple or yellow in color, grow in clusters that vary in shape according to their species; the individual blossoms are small and produce a podlike fruit late in the summer. The plant renders insane the cattle that feed upon it, and stockmen watch carefully that it does not appear upon their pastures. The name loco weed is derived from the Scotch word *loco,* meaning mad.

**Lo'cust,** a tree or shrub of the Pulse, or Pea, Family, native in the Alleghenies but planted in parks and along streets throughout central United States. Generally it is a straight, broad-topped tree, whose chief beauties are its light green,

delicate leaves and fragrant white flowers. The leaves are made up of 12 to 15 oval leaflets, and the flowers, which are butterflylike and hang in long, drooping clusters, are attractive, rendering it one of the most popular ornamental trees in the United States. The fruit, like that of all members of this family, is a pod. The yellow locust has very rugged bark of light gray color; the clammy locust is smoother with longitudinal scars on its surface. Other common locusts are the water and the honey locust. See HONEY LOCUST.

**Locust,** the popular name of a family of Insecta known scientifically as the Acridiidæ. An unfortunate confusion has arisen in regard to terms, for the family scientifically known as the Locust is popularly known as the Grasshopper. Such interchange of terms is now too well grounded to be remedied, and is only avoided by the explanation as to



LOCUST

whether the term *locust* is used popularly or scientifically. For a discussion of the Locust Family, see GRASSHOPPER.

The locusts discussed here are those sometimes known as the short-horned grasshoppers because of their comparatively short antennæ, which are never more than one-half the length of the body and are made up of 25, or less, segments. A horny sheath covers the neck and thorax, and from it the head projects in a downward position, which brings the mouth parts upon the underside. The body is strong and thickened; the hind limbs are long and in many species extend backward rather than up, so that the knee joint does not lie above the line of the back. The forewings are narrow and act as covers for the thin, much-folded hind wings, which spread to an unexpected extent when the locust is in flight. The wings, however, are less commonly used than the hind limbs, for the locust is a leaping, rather than a flying, insect.

As with the grasshopper, the sound-making device, or stridulating organ, belongs only to the male. Some produce their "chirp" by rubbing the roughened hind legs against the stiffened wing covers; others chirp only during flight and do so by rubbing the upper surface of the hind wings against the lower surface of the forewings.

Locusts often appear in great swarms and do incalculable damage to growing crops, destroying whatever growing grains or young vegetation lies in their path. The increased cultivation of the land seems to have rendered the pest less common. Where they do become numerous, flocks of turkeys are of great assistance in keeping them down. Spraying crops with poisonous solutions (See INSECTICIDE) and plowing fields late in the fall to destroy the wintering eggs are effective means of destroying the insects. The so-called 17-year locust is really a cicada. See CICADA; ORTHOPTERA.

**Lodge, Henry Cabot** (1850- ), an American author and statesman, born in Boston. He graduated from Harvard in 1871 and was admitted to the bar in 1876. From that date until 1879 he was lecturer on American history at Harvard, from 1873 to 1876 was editor of the *North American Review,* and of the *International Review* from 1879 to 1881. After serving in the State Legislature he entered the lower house of Congress in 1887, where he remained until 1893, when he became United States senator, being reelected in 1899, 1905 and 1911. He was a delegate to all the Republican National conventions from 1884 to 1912. He is recognized as an able writer as well as lawyer and legislator. His writings include *Studies in History, Hero Tales from American History, Short History of the English Colonies in America,* and biographies of Washington, Hamilton and Webster.

**Lodz,** the capital of the district of Lodz, in the Government of Piotrkow,

in Russian Poland. It is situated 87 m. by rail s. w. of Warsaw, on the Ludka River, and ranks next to that city in importance. The textile industry has developed rapidly since its establishment in 1815, and in addition to the production of cotton, silk and linen goods, machinery is also manufactured. The inhabitants are, in the main, Poles, Germans and Jews. Population, about 352,000.

**Loeb,** *Lobe,* **Jacques** (1859- ), a German-American biologist, educated in Berlin, Munich and Strassburg. He became successively assistant professor of physiology at the University of Würzburg and at the University of Strassburg, associate professor of biology at Bryn Mawr College, professor at the University of Chicago, professor of physiology at the University of California and, in 1910, head of the department of experimental biology at the Rockefeller Institute for Medical Research in New York. Professor Loeb is especially famous for having shown the effect of salt solutions on the heart. His latest book is *Chemical Fertilization of the Animal Egg.*

**Loess,** *Lo' es,* a porous, loamy deposit occurring in abundance in the valleys of the Rhine, Danube and Rhône, and in the Mississippi Valley of the United States and in China. It is gray or brown in color, and in texture is a fine-grained sand, with an admixture of clay, but not enough to render it plastic. Small grains of quartz, fine scales of mica, some carbonate of lime and oxide of iron also are present. Loess imparts fertility to the soil, especially when containing remains of organic matter; but it requires considerable moisture on account of its porous nature. Theories differ as to the origin of loess. Its occurrence in river valleys is probably due to stream deposition, the sediment from melting ice during the glacial and postglacial periods having thus been brought down. However, where vast deposits occur, their origin has been attributed to glacial lakes, and again to action of the wind. The chief commercial value of loess is in the manufacture of bricks, which closely resemble the adobe used for building in the Southwest. See ADOBE; GLACIAL PERIOD; SOIL.

**Lofo'ten,** or **Lofo'den,** a chain of islands extending about 175 m. off the northwestern coast of Norway. Their surface is generally rugged, and, on one, mountains rise to a height of 3000 ft. The inhabitants live along the coasts and support themselves by scanty agriculture and sheep raising, and by the cod fisheries which have been famous for centuries, now employing about 30,000 men. The fisheries are among the richest in the world and they have long constituted the chief national wealth. Population, 43,000.

**Log,** a device by which the rate of a ship's travel through the water is measured. The common log consists of a piece of thin board, forming the quadrant of a circle having a radius of about six inches, one end of which is weighted with lead so as to make it stand upright when thrown into the water. One end of a log line is fastened to the log, while the other is on a reel. When the log is heaved, or thrown overboard, at the stern of the vessel, the length of the line unwound in a given time forms the basis of a calculation for the rate of the ship's speed. Various mechanical devices are used instead of the common log, one being a triangular box towed astern, containing a spindle on which there are four wings attached spirally. The action of the water rotates these, and by means of a series of wheels, which move a hand on a dial, the distance traveled is recorded.

**Lo'gan, John Alexander** (1826-1886), an American soldier and statesman, born in Jackson County, Ill. After serving in the Mexican War, he entered and graduated from Louisville University. He then practiced law and served in the Illinois Legislature and in Congress until 1861, when he resigned to enter the army. He was at first a private in a Michigan regiment and participated at Bull Run, but he was soon made colonel in an Illinois regiment, and saw service at Belmont, Ft. Henry and Ft. Donelson. As major-general he commanded a division in the Vicksburg and Atlanta cam-

paigns of 1863-64, being conspicuous at Kenesaw Mountain and being twice in command of the Army of the Tennessee. From 1866 to 1871 he again sat in Congress, and he then succeeded Richard Yates as United States senator. After practicing law in Chicago for a short time, he returned to the Senate in 1879, and here was reelected in 1885, gaining a wide reputation as an aggressive and effective orator. Previously, in 1884, he had been Republican candidate for vice-president on the unsuccessful ticket headed by James G. Blaine. He wrote *The Great Conspiracy* and *The Volunteer Soldier of America*. Consult Dawson's *The Life and Services of John A. Logan*.

**Logan, Utah,** a city and the county seat of Cache Co., about 75 m. n. of Salt Lake City, on the Logan River and on the Oregon Short Line and other railroads. The city contains, among other industrial plants, flour mills, a brewery, knitting mills, lumber mills and manufactories of beet sugar and condensed milk. It is the seat of the Utah State Agricultural College, of Brigham Young College, and of the New Jersey Academy, controlled by the Presbyterian denomination. Logan was settled in 1859 and incorporated in 1866; and was until recently operated according to a general state act of 1898. It is now administered under the commission form of government. Population in 1910, 7522.

**Lo'gansport", Ind.,** a city and county seat of Cass Co., 75 m. n. w. of Indianapolis, on the Wabash River at the mouth of the Eel River, on two divisions of the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad, and on the Wabash, the Vandalia and other railroads. The Ft. Wayne & Wabash Valley and the Indiana Union Traction Company also operate interurban lines. Logansport is locally known as the "City of Bridges." Abundant water power and natural gas contribute to the industrial advantages. The city controls a large trade in lumber, grain and pork, and has manufactories of automobiles, motors, car trucks, hubs and spokes, flour, furnaces, water wheels, baskets, brooms and iron, brass and aluminum castings. The quarries near the city limits furnish large quantities of crushed limestone. Logansport contains a number of institutions, among them being Longcliff, the Northern Indiana Hospital for the Insane, Home for the Friendless, an orphanage and St. Joseph's Hospital. There are also a public library and fine Federal Building. The city was named after Captain Logan, a Shawnee chief, who was killed by the Indians in November, 1812. It was incorporated in 1831 and received a city charter in 1838. Population in 1910, 19,050.

**Log'arithm** of a number, the exponent of a fixed number, called the base, which indicates the power to which the base must be raised in order to produce the number. Thus since $8^2 = 64$, 2 is the logarithm of 64 to the base 8; 64 is then called the antilogarithm of 2. The value of logarithms in practical use depends upon the algebraic laws that in multiplying like terms the exponents are added; in dividing, they are subtracted. Thus since $8^2 = 64$ and $8^3 = 512$, $8^2 \times 8^3 = 8^5 = 32768$; expressed logarithmically this would be $\log_8 64 = 2$

$\log_8 512 = 3$

$\log_8 32768 = 5$; and would be read logarithm of 64 to the base 8 is 2, etc. By the use of lists of the logarithms of numbers, called logarithm tables, the mechanical operations of multiplication and division of large numbers are greatly simplified. A guide to the method of using the tables is generally given with them, but in practical use logarithms are of value chiefly to engineers or to those who have long mechanical operations to perform.

Logarithms were probably first computed by the mathematician Bürgi, who lived from 1552 to 1632. He, however, attached little importance to his invention, and John Napier of Scotland is regarded as the father of logarithmic computation. In 1814 he announced his invention, published his tables and showed the uses to which they could be put. In 1624 Briggs calculated a table of loga-

rithms upon the base 10, and this is the system in use at present and known as the common, or Briggs, logarithms. He found these by listing first the perfect powers of 10; as,

$10^1 = 10$
$10^2 = 100$
$10^3 = 1000$

and then introducing between these the geometric means of the numbers in the right-hand column and the arithmetic means of the exponents in the left-hand column. By continuing this operation and carrying it out sufficiently in decimals a great degree of accuracy was obtained. The modern method of computing the tables is by means of what has been termed the logarithmic series. Hutton's *Mathematical Tables and Mathematical Tracts* gives a complete account of the construction of the early tables.

**Log Book,** a book used on ships in which all records of the voyage are made daily. These include weather notes, ships hailed or seen and all events of the voyage. In almost all the navies of the world, the commanding officer has charge of the log book, and it is a strict rule to have all events recorded and signed daily. When the book is full, it is filed among the archives of the navy department as a record. See NAVY.

**Logic,** *Loj' ik,* (from Greek *logikos,* pertaining to speaking or reasoning), the branch of philosophy that deals with reasoning, or the science of correct thinking. There are three sciences which deal with thinking: (1) *psychology* treats the processes of thinking as *mental occurrences,* without reference to whether they are valid or invalid, true or false; (2) *epistemology* treats of the *validity* of the thinking processes, in connection with the whole question of the validity of knowledge; (3) *logic* deals with the problems of *correct* thinking and answers the question, What are the laws of valid reasoning? Reasoning may be of two kinds. It may be deductive, proceeding from the general to the particular. If we know that all birds are animals, and that robins are birds, we know that robins are animals. In such reasoning logic employs the deductive syllogism (See SYLLOGISM). Or, reasoning may be inductive, proceeding from the particular to the general. This is the method usually employed in science and in common life. If I observe that eagles, ducks, chickens, crows, blue jays and many other birds have wings, I come to the conclusion that all birds have wings. This is what we call *generalizing.* In such manner the hypotheses of science are formed. But such conclusions are not always correct. If I note that ducks, geese and swans swim, and conclude therefrom that all birds swim, I make a mistake. All general conclusions drawn from particulars, therefore, must be carefully tested and are never infallible. As a matter of fact our ordinary reasoning is partly deductive and partly inductive. Logic considers these laws of correct reasoning in detail.

FALLACY. By *fallacy* we mean a violation of the rules of reasoning. A common form of fallacy is arguing in a circle; that is, stating as a premise the fact to be reached as the conclusion. Another form consists of the use of a term in such a manner as to disguise or pervert its meaning, as the wrong use of emphasis or accent. See INDUCTIVE METHOD; DEDUCTIVE METHOD; ÆSTHETICS.

**Log'wood",** a Central American tree of the Cæsalpine Family. The bark and sapwood are of little commercial value, but the heartwood is used in the manufacture of a rich purple dye whose color, however, is not stable unless treated with a fixing solution called a mordant. The wood itself is crimson and for this reason the tree has the local names of heartwood and bloodwood. Logwood is also used in medicine and as an antiseptic. It is now quite extensively cultivated in the West Indies.

**Lohengrin,** *Lo' en grin,* the hero of medieval German legend of the knight of the swan. He was one of the knights of the Holy Grail and was sent by King Arthur from the Castle of the Grail to the help of Elsa, Princess of Brabant.

Lohengrin traveled on a boat drawn by a swan. Elsa's foe, Telramund, was vanquished at Mainz, and Lohengrin married her with the provision that she should never inquire his origin. She disobeyed him, and the swan returned, while Lohengrin departed. This legend was celebrated in Wolfram von Eschenbach's *Parzival,* and is also the basis of Wagner's opera, *Lohengrin,* first produced at Weimar, Aug. 28, 1850. Different versions of this story occur in French legend and literature.

**Loire,** *Lwar,* the longest river of France. It rises in the Cévennes in the Department of Ardèche, turns from a north and northwesterly direction to southwest and west, and empties into the Bay of Biscay at Saint-Nazaire. Its total length exceeds 620 m., of which 490 m. are navigable at certain periods of the year. At times the melting snows cause disastrous floods.

**Loki,** *Lo' ke,* (Lightning), in Northern mythology, giant deity of fire, was backbiter of the gods and originator of all deceit and mischief. Handsome, of fine physique and great ingenuity, he was the embodiment of seductive and seemingly innocent wickedness. When, however, he was compelled to exert his abilities for the good of the gods, the results were most helpful. Loki was emblematic of hearth fires, and when the logs snapped in the flames, Norsemen believed that the god was beating his children. On the introduction of Christianity, Loki, being "arch deceiver" and "prince of lies," was identified with Satan.

**Lol'lards,** the name first applied about 1300 to a society arising in Antwerp and Brabant, the members of which were engaged in the care of the sick and the burial of the dead. The name is more commonly known, however, as the designation of the followers of John Wiclif, in the 14th and 15th centuries. The Lollards in England condemned the use of images in the churches, pilgrimages to the tombs of the saints, the temporal lordship of the clergy, papal authority in administration, the mass, transubstantiation, war and the infliction of capital punishment. They were severely persecuted, especially during the reign of Henry V, but Lollardism continued until the time of the Reformation.

**Lom'bard, Peter.** See PETER LOMBARD.

**Lombards,** a Teutonic people living on the Lower Elbe at the beginning of the Christian Era. They settled the neighborhood of the Danube in the fifth century, and in the sixth century, under their ruler, King Alboin, they conquered the northern part of Italy. In the middle of the eighth century the Lombard Kingdom reached its highest prosperity, but was overthrown in 774 by Charlemagne, and the country became a part of his empire.

**Lom'bardy,** the historic name of that part of northern Italy including the provinces of Bergamo, Como, Mantua, Brescia, Sondrio, Pavia, Milan and Cremona. It is, in the main, a fertile plain, occupying an area of 9374 sq. m. The name was derived from the fact of the Lombard invasion in the sixth century. The Lombard Kingdom came to an end in 774 by the conquests of Charles the Great, King of the Franks. See ITALY.

**Lo'mond, Loch,** *Lok,* the largest lake in Scotland, situated in the counties of Dumbarton and Stirling. It is about 23 m. in length. The surrounding mountains and wooded hills and its pretty islets form a picturesque scene. It is near Loch Katrine and the Kossachs, and is visited by many tourists.

**Lon'don,** the capital of England and the British Empire and the largest city in the world. It is situated on both banks of the River Thames, about 50 m. above its estuary; the river is from 600 to 900 ft. wide and is spanned by 14 bridges (within the County of London), among which "London Bridge" is foremost in point of usage as a modern highway and in historical interest. Surrounding the city below the Thames are low marshes, from which the city is seen to rise in an undulating plain north of the river. North of the Thames the distinct division of the city is between East and West, "East

# THE METROPOLIS OF THE WORLD

Population one and one-half times that of Greater New York.

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REGENT STREET, LONDON

End" being generally recognized as the very heart of the poor territory. The western part includes Westminster and parts of Chelsea, Kensington, Marylebone and Paddington, and here are seen all the characteristics of higher-class life —the finest private residences, public parks and palaces in the city. South of the Thames again everything speaks of poverty, and the grandeur and wealth of the districts to the northwest are wholly lacking. The fact that London is the outcome of the growing together of a large number of smaller cities accounts for the fact that the different parts of the huge world metropolis present such varied aspects—unlike the characteristics of the majority of large cities which grow around a center. On the whole, the city lacks beauty, for the streets are narrow and densely peopled, and in the making of its various parts the Anglo-Saxon love for the practical is everywhere apparent.

Climate. The two disadvantages of London climate are the abundance of fog and mist, due to the neighboring seas, and the prevalence of smirchy smoke, arising as a result of the large quantities of bituminous coal consumed to meet both industrial and domestic needs. On the whole, the climate is favorable, and the aggravation of diseases of the respiratory organs by this fog and smoke has been unnecessarily emphasized.

Streets, Bridges and Parks. The streets of London are generally narrow and congested and do not adequately meet the needs of the heavy street traffic. Among the streets which have become world-famous, due to historic or commercial associations, are Fleet Street (connected with the newspaper trade); Oxford (known as the principal business thoroughfare next to Regent Street, where some of the most fashionable shops of the city are located); Piccadilly; Paternoster Row (the headquarters of the book trade); the Haymarket (containing the principal theaters and hotels); Bond Street; Pall Mall (the center of club life); and the Thames Embankment, which, along the north side of the river, forms into some of the most beautiful promenades in the world.

The bridges crossing the Thames include London Bridge, which, with its rows of houses and chapel in the center, was completed in the 13th century, and the Suspension, or Tower, Bridge, one of the engineering and architectural triumphs of the age. Others are Southwark, Blackfriars, Waterloo, Westminster, Battersea, Vauxhall, Victoria and Albert.

There are four royal parks: St. James's, Green, Hyde Park and Kensington Gardens. The total area of the London parks is 2900 acres. Hyde Park presents the most brilliant and varied scene, with its thousands of people who flock to enjoy the beauty of its lake, its heavy clumps of shrubbery and its immense trees shading wide expanses of green. The gardens along the Thames Embankment are the frequent resort of crowds of children and pleasure seekers. The principal squares of the city are Trafalgar, Lincoln's Inn Fields (the largest square), Hanover, Portman, Berkeley and Cavendish.

Buildings and Monuments. Brick is the building material most commonly in use for domestic purposes, and except in the fashionable West End, where quarries and factories are noticeably absent, the smoke-laden air has robbed the city of any bright colors and given it instead a somberness which in its very dullness and grayness lends an air of mystery and picturesqueness to the whole. The "Old City" is the financial center of London, and it is estimated that more than 1,000,000 people work within its narrow limits during the day and at night forsake it for the pleasanter suburbs on the outskirts, leaving there only the police, the caretakers and their families. The Tower is perhaps foremost among the buildings of London for historic interest, and the old prison is now used as an armory and arsenal, and as a place for guarding the crown jewels of the kingdom. Westminster Abbey is one of the finest examples of Gothic architecture in England; the old chapel re-

ceived its name from the city in which it was erected in the days before Westminster lost its identity by being merged with London (See WESTMINSTER ABBEY). The Houses of Parliament front the River Thames for 940 ft., and with their two miles of corridors and over 1000 rooms are among the largest Gothic edifices in the world. Features of interest connected with them are the Clock Tower (316 ft.), with the great hourbell "Big Ben," and, on the interior, the House of Peers, the House of Lords and Westminster Hall. Among the prominent palaces are St. James's, Buckingham Palace, Marlborough House, Kensington Palace and Whitehall.

The churches of London have one characteristic of distinction—the steeple; and the cause of this can be traced to the activity and enterprise of Sir Christopher Wren (See WREN, SIR CHRISTOPHER), who by sheer need of economy concentrated his attention upon that particular feature. Prominent among the churches are St. Paul's Cathedral, Bow Church (with one of Wren's most noteworthy steeples), St. Martin's-in-the-Fields, the Roman Catholic Westminster Cathedral and Lambeth Palace.

The Bank of London is one of the most characteristic secular buildings of the city. The supreme courts of the kingdom are now found in a building occupying nearly four acres at the junction of the Strand and Fleet Street. The palatial Sessions House now occupies the historic site of the Old Bailey and the Newgate Prison, both of which were demolished to make room for the spacious new edifice. There are four Inns of Court: the Inner Temple, Middle Temple, Lincoln's Inn and Gray's Inn. The club buildings of the city are highly ornamental and impressive in architecture and proportion. They include the Athenæum, whose members are principally artists and men of science and letters, the Garrick (patronized by lovers of the drama), the Army and Navy, Brook's, Whites, the Reform Club in Pall Mall and the Carlton, the great Tory club.



There are over 36 theaters, including Covent Garden, Drury Lane, the Strand, the Lyceum, the Savoy, the Adelphi, the Haymarket, the Princess and the Criterion. Among the large music halls are the Alhambra, the Empire and the South of London Palace of Amusements. There are numerous museums of world-wide importance, foremost of which is the British Museum, that vast edifice including within its walls the countless treasures of art and nature and attracting yearly thousands of visitors who come there to work out undisturbed their problems of research (See BRITISH MUSEUM). Others are the Imperial Institute, the Natural History Museum, the Royal Albert Hall of Arts and Sciences, the Royal College of Music, the anatomical, geographical, geological and anthropological museums. The most complete collection of living animals in the world is the property of the Zoological Society and is installed in Regent's Park. Famous collections of paintings and sculptures are found in the National Gallery in Trafalgar Square, the Royal Academy of Art and the Victoria and Albert Museum.

MARKETS. London is famous for its picturesque markets, the remarkable display at dawn constantly attracting numberless tourists. Retail stores are gradually taking their place, but the poorer classes still obtain almost all their supplies from street venders, whose cries have long been the source of much interest. The principal markets are Covent Garden (flowers and vegetables), Leadenhall (poultry and game), Billingsgate (fish) and Smithfield (meat).

EDUCATION. There are nearly 1000 common schools, with an attendance of over 500,000 pupils. In addition are middle-class schools and endowed schools, but London is not a great university center, as are Oxford and Cambridge. The University of London, formerly merely an examining body, contains numerous institutions of all kinds, at the head of which are King's College and University College. Excellent instruction in medical and surgical science

is afforded in the city and attracts students from all parts of the world. Due to the large book-publishing trade, its numerous newspapers, the abundant literary and scientific societies, London is unquestionably the great literary and scientific center of the empire.

Population. The population of Greater London is estimated at 7,010,172, thus comprising more than one-fifth of the total population of England and Wales. About three per cent represent the natives of the British colonies and those of foreign birth, while more than one-half of the total inhabitants were born in London.

Communication and Commerce. The scenes of the streets of London are unrivaled among the cities of the world, so far as the multitudes that throng its thoroughfares are concerned. It is estimated that over 20,000 vehicles and 100,000 foot passengers cross London Bridge daily, and streets like Cheapside and the Strand witness the influx of the largest numbers. The principal means of communication are passenger boats for crossing the Thames, four tunnels (Thames, Greenwich, Blackwall and the Tower Subway) under the river, over 240 m. of street railroads and a complete and efficient system of surface and underground railroads. Thousands of cabs, carriages and omnibuses carry a large per cent of the floating population. The foreign trade of London is rapidly approaching the billion and a half dollar mark. The exports are comparatively small, for London is preeminently a center for the consumption of food and other supplies. The city is also the distributing point for articles consumed throughout Great Britain, the center of the railroad system of the islands and the chief British market for colonial wares.

Industries. London is still the principal manufacturing city of the empire, although within recent years it has been surpassed by Leeds, Sheffield, Birmingham and other cities in specialized lines of production. The industrial establishments are grouped principally in the

LONDON

southeastern part of the city and on the Surrey side of the River Thames. The chief industries represented are the manufacture of machinery, furniture, clothes, the weaving of silk and printing. Since the introduction of iron and steel, London is no longer the great shipbuilding center, but now yields its position to those cities which are nearer the large iron and coal fields. The money interests of the world center in the metropolis, more specifically, in the Bank of London, the principal bank of deposit and circulation in Europe. This gives rise to a vast accumulation of capital, which in turn attracts the attention of investors who are constantly seeking favorable opportunities for floating enterprises here or in almost any other part of the world.

Government. The British Government exercises central control of the affairs of London, while the duties and powers of local authorities are defined by Parliament. Among the boards with special functions are the Board of Education, of Trade, the Metropolitan Asylums Board, the Local Government Board, etc. The city has a debt of over $230,000,000 and the annual cost of the government far exceeds $85,000,000.

History. The history of the city dates back farther than the landing of the Romans, for upon their entry they found a town of fairly large size, near which they established their first colony. With the arrival of the Normans the Tower was begun by William the Conqueror as an effective citadel commanding the city, and many improvements were effected. During the Middle Ages, wars, epidemics and financial crises checked rapid progress and growth in the city, and it was not until the 16th century that marked advancement in commerce and trade became apparent. The plague of 1665 and the fire the following year wrought great havoc and effected serious disasters, but permanent gain was made for the rebuilt city in wider streets and more open spaces everywhere. Since the beginning of the 18th century the progress and development has witnessed

a steady forward growth, and, through the Oriental commerce which the country's permanent footing in India secured, London has steadily grown until it has become what it is now—the metropolis of the world.

**London,** a city of Canada in the Province of Ontario, county seat of Middlesex County, 121 m. s.w. of Toronto, midway between Niagara Falls and Windsor, at the junction of the North and South branches of the River Thames, and on the Canadian Pacific, the Michigan Central, the Pere Marquette and the Grand Trunk Railroads. The London & Port Stanley, a municipally-owned road, connects London with Lake Erie, 23 m. to the south. London is the chief railroad center of western Ontario, and it is said that more trains enter and leave the city during the 24 hours than any other city in Canada. The city itself, as well as many of the streets and localities, is named from London, England. The handsome parks and broad, well-shaded streets have given London the name of the "Forest City." It is situated in the midst of a rich agricultural region and is an important distributing center, the wholesale houses being represented all over the province. The city contains large stove works, foundries, machine shops, flour and rolling mills and manufactories of agricultural implements, boots and shoes, caskets, clothing, carriages, chewing gum, cigars, brick, tile and cement. All the chartered Canadian banks have branches here. Among the educational institutions are Western University, Sacred Heart Academy and Huron College. The benevolent and charitable institutions include the provincial asylum for the insane, several hospitals and homes. London is the seat of a Catholic see and of an Anglican diocese. There are a large number of churches, including two cathedrals. Population in 1911, 46,000.

**London, Jack** (1876- ), an American novelist, born in San Francisco, Cal. He studied at the University of California, but departed to the Klondike before completing his course of study and never returned to take his degree. In 1892 he went to sea, traveled through Japan, engaged in seal hunting in the Bering Sea and later tramped on foot through Canada and the United States, gaining material for articles and lectures on socialism. He began to write tales of adventure in 1894 and has since published a great number of books and contributed freely to magazines and other periodicals. His works include *The Son of the Wolf, The God of His Fathers, A Daughter of the Snows, The Children of the Frost, The Cruise of the Dazzler, The People of the Abyss, The Call of the Wild, The Faith of Men, The Sea Wolf, The Game, Tales of the Fish Patrol, Before Adam, Love of Life, When God Laughs* and *The Cruise of the Snark.*

**London Company,** one branch of a company organized in London in 1606 for the purpose of founding two colonies in America. This division of the company, known also as the Virginia Company, was to have jurisdiction over the territory lying between 34° and 41° north latitude, with 100 m. of seacoast, including all islands 100 m. to the eastward and all territory 100 m. to the west. It was to have a resident council of 13 members, subordinate to the superintending Council of Virginia and subject to the pleasure of the Crown. The first charter, granted by King James in April, 1606, was followed by a new charter in 1609, giving the company the privileges of a corporation. The first expedition of the company founded the Jamestown Colony in Virginia.

**Long Beach, Cal.,** a city and summer resort of Los Angeles Co., 22 m. s. of Los Angeles, on the Pacific coast several miles east of San Pedro, and on the Southern Pacific and other railroads. A number of electric lines reach the city from Los Angeles, Pasadena and adjoining towns and cities. Long Beach has one of the finest stretches of level beach on the coast. There is a pleasure pier, 1600 ft. in length, with an auditorium at the outer end seating 4000 people, and fine hotels and cottages. Dur-

ing the past few years the growth of Long Beach has been rapid, a protected harbor having been dredged within the city limits where the Los Angeles River empties into the sea. Long Beach, hitherto known chiefly as a pleasure resort, is becoming an important manufacturing and shipping center. Population in 1910, 17,809.

**Long Branch, N. J.**, a city and popular summer resort of Monmouth Co., 32 m. s. of New York City, about 70 m. n.e. of Philadelphia and 7 m. from Asbury Park, on the Atlantic Ocean and on the Pennsylvania, the Central of New Jersey and the New Jersey Southern railroads. During the summer several palatial lines of steamers run between New York City and the various Atlantic coast resorts, including Long Branch. The city is situated on a bluff overlooking the sea and has wide avenues and many fine hotels and residences. Ocean Avenue, five miles long, connects with Elberon, also an attractive resort. Long Branch is one of the oldest resorts in the United States and settlements were made as early as 1670. It derives its name from the "long branch" of the Shrewsbury River, and the long beach affords excellent bathing facilities. Prior to its occupancy by summer guests, which now number thousands, it was frequented by fishermen and wreckers. It has many churches and a fine library. The Star of the Sea Academy and the Monmouth Memorial Hospital are located here. Population in 1910, 13,298.

**Longfellow, Henry Wadsworth** (1807-1882), an eminent American poet, born at Portland, Me., February 27, the second of a family of eight children. The Longfellows, from the first of that name who immigrated to America (1676) down to the poet's father, Stephen Longfellow, had borne an honorable reputation, while his mother, Zilpah Wadsworth, was of the race of John and Priscilla Alden. The early influences that helped to shape the boy's character were of the best. Brought up by refined and cultured parents in a town that stood for simplicity and purity of life, Longfellow as a child was led to cultivate those virtues that so beautified his life in after years.

Boyhood in Portland. The first school Longfellow attended was in charge of a "Ma'am" Fellows, an austere lady who believed that the schoolroom was no place for smiling. Later he was sent to a private school, and, finally, to the Portland Academy, where he was prepared for college. Longfellow's literary tastes were early manifest. When Irving's *Sketch Book* appeared in 1819, it became at once his favorite book, and continued to charm him all his life. He began to write verses when he was only 13, some of which were published in a local paper of Portland, and his progress as a student is indicated by his entrance into Bowdoin College, Brunswick, as a sophomore, at the age of 15, to become one of the memorable class of 1825. Among his classmates were Hawthorne, the historian John S. C. Abbott and several others who afterward attained distinction in law and politics.

Student and Teacher in Brunswick. Longfellow's college career, though not eventful, served as a preparation for more important work to come later. A sentence from one of his letters indicates the seriousness with which he regarded this period of his life: "Whatever I study I ought to be engaged in with all my soul, for I will be eminent in something." His devotion to his studies did not, however, prevent his writing poetry, and many of the poems written while he was in college appeared in various periodicals. At this period he was greatly influenced by the poet Bryant, who began a literary career in New York in the year that Longfellow graduated.

Although his father hoped that he would study law, Longfellow left college with a burning desire to exercise his literary talents. Most happily for the poet and indicative of the honorable record he had gained in college, a professorship of modern languages was offered him by the trustees of Bowdoin, with the proposal that he complete his preparation for this work by travel and study in Europe.

A position so entirely in accordance with his tastes was accepted joyfully, and Longfellow sailed for Europe in the spring of 1826, where he remained for three years, assuming his duties at Bowdoin in 1829. The happiest event of this period of teaching was his marriage in 1831 to Miss Mary Potter. About the same time he began a series of travel sketches that were later published, with some others, under the name of *Outre-Mer*.

Professor in Cambridge. In 1834 Longfellow was tendered the Smith professorship of modern languages at Harvard, and in the spring of the following year he made a second journey to Europe, in company with his wife, for the purpose of further language study. The death of Mrs. Longfellow at Rotterdam, in November, was a sad blow, but he continued his study and travel, returning home in October, 1836, and entering upon the duties of his Harvard professorship in December of the same year. This position he retained for 18 years.

The town of Cambridge, in which Longfellow was to make his home the rest of his life, was then the literary center of New England, and the poet soon became associated with a noteworthy group of scholars and writers. He engaged a room in the fine old colonial mansion, known as the Craigie House, which later became his home, and here he began the work in literature that was to be the foundation of his fame. *The Reaper and the Flowers* appeared in 1837; the next year the *Knickerbocker Magazine* published *A Psalm of Life,* which became popular at once. *Hyperion,* a romance based upon his own experience, was published in 1839, closely followed by the first collected volume of his poems, *Voices of the Night.* In 1841 a second volume appeared, containing *The Wreck of the Hesperus, The Village Blacksmith* and other well-known poems. A third trip to Europe in 1842 brought him new inspiration and repaired his health, severely taxed by his busy life in Cambridge. On the journey home he wrote *Poems on Slavery.*



In June, 1843, Longfellow married the beautiful daughter of the Hon. Nathan Appleton of Boston, who purchased the Craigie mansion and the pleasant fields about it, presenting it to his daughter as a home for herself and husband. Two sons and three daughters, the Alice, Edith and Allegra of *The Children's Hour,* blessed a union that was unusually happy. Longfellow continued his work at Harvard until 1854, when he resigned in order to devote his time more fully to literature; but during those busy years he wrote his most ambitious poem, *Evangeline* (1847), and *Kavanagh* (1849), *The Building of the Ship* (1851) and *The Golden Legend* (1851). The next few years, which produced *Hiawatha* (1855) and *The Courtship of Miles Standish* (1858) mark the close of the brightest and most successful period of the great poet's life.

Later Years. In 1861 the sudden and tragic death of his wife came upon Longfellow with crushing force, and although his strength of character and serene religious faith enabled him to rise above his sorrow, its shadow was never wholly lifted. He found comfort in working on a translation of the *Divine Comedy,* and gradually resumed the tranquil course of his life in the home that was always a place of bountiful hospitality. To this later period belong *Tales of a Wayside Inn, Paul Revere's Ride, The Children's Hour* and *Ultima Thule.* In 1868 he made his last journey to Europe, where he was received with every mark of respect and admiration. Among those who generously welcomed him was Queen Victoria. On his 72nd birthday, this well-beloved "Children's Poet" was presented with a chair made from the wood of the famous chestnut tree mentioned in *The Village Blacksmith,* by the children of Cambridge, to whom he responded with the beautiful poem *From My Arm Chair.*

To the end of his life Longfellow kept his sunny, genial nature, but physical pain and loneliness were the portion of his last years. He died on the 24th of March, 1882. Among those who were

present at the simple funeral services were Emerson, Holmes, George William Curtis and President Eliot of Harvard. Shortly after his death his children presented the Longfellow Memorial Association with the meadow in front of the old home, so that the pleasant outlook over the Charles River, from Craigie House, will always remain as Longfellow loved to view it from his study.

Literary Qualities. That Longfellow, the most scholarly of our American poets, appealed especially to the people, not to scholars, is a tribute to the simplicity and kindliness of his nature. In this regard he is the opposite of that eccentric American, Walt Whitman, who, admittedly a poet of the masses, is appreciated by a very limited circle. In respect to their circle of readers, Longfellow is more nearly akin to Whittier, though Whittier was not a traveler, he spoke only his native tongue, he had no college training and he led the simple life of a recluse. The poetry that brings comfort and inspiration to those who love it in its simple forms, both Longfellow and Whittier wrote, because both were genuinely unselfish, sympathetic, unafraid to express what they felt.

Longfellow's poetry is characterized neither by originality nor profound analysis. He accepted life as he found it, not seeking for hidden truths or a new philosophy. His subjects are mainly the familiar incidents and experiences of life, aspects of nature as related to human feeling, and heroic deeds recounted in legend and history. His travel abroad and extended knowledge of the older literatures suggested many of his poems, his translations and his romances. All of his work displays unerring taste, clearness of language and delicacy of rhythm, while in such a poem as *Hymn to the Night* he shows himself capable of stirring and majestic effects.

In the consideration of Longfellow's services to American letters, his scholarship is sometimes overlooked. He was the first American to recognize fully the romantic beauty of the Old World literatures, and it was a part of his mission to awaken his own country to a sense of this beauty. That the Old World appreciated his position in literature is attested by the erection, in 1884, of a memorial bust in the Poets' Corner of Westminster Abbey. Yet the greatest poem that Longfellow created was his own life, which was a harmonious blending of all the ideals and aspirations his poems had voiced, a life that will always be a source of inspiration.

His heart was pure, his purpose high,
  His thought serene, his patience vast:
He put all strifes of passion by,
  And lived to God from first to last.

His song was like the pine-tree's sigh
  At midnight o'er a poet's grave,
Or like the sea-bird's distant cry,
  Borne far across the twilight wave.

There is no flower of meek delight,
  There is no star of heavenly pride,
That shines not sweeter and more bright
  Because he lived, loved, sang, and died.

—*William Winter.*

**Long Island,** an island in the Atlantic forming the southeastern extremity of New York. It is separated from the mainland on the north by Long Island Sound, and on the west by the East River and New York Bay. A number of suspension bridges span East River and connect the island with the mainland. Long Island is about 120 m. long and varies in width from 12 to 23 m. Its area is 1682 sq. m. The west end is densely populated, being occupied by the borough of Brooklyn, which is a part of Greater New York. It contains many railways and electric lines and noted summer resorts. Truck gardening is carried on, and many vegetables are raised for the New York market.

**Long Island, Battle of,** a battle of the Revolutionary War, fought on Brooklyn Heights, Aug. 27, 1776. Israel Putnam with 8000 Americans, half the entire army, was attacked by 15,000 British under General Howe, who advanced along four different roads, assailing the Americans on all sides. After several hours of brave fighting, Howe decided to besiege the position; but Washington determined to withdraw. In

doing so, he performed one of the most brilliant military exploits of the war. In the morning Howe was chagrined to find that his prize had escaped.

**Long Island Sound,** an arm of the Atlantic, separating Long Island from the states of New York and Connecticut. It is 110 m. long and from 20 to 25 m. wide. The strait called East River connects it with New York Bay; here was formerly found the narrow passage known as Hell Gate (See HELL GATE). It receives the Connecticut, Thames, Housatonic and Mystic rivers. The Long Island shore is easy of approach, and it contains several good harbors.

**Longitude,** *Lon' ji tude,* the angular distance east or west of any given meridian, called the prime, or first, meridian. A prime meridian is any meridian from which one may choose to reckon longitude, meridian meaning midday, or the line from pole to pole, at every point of which noon occurs simultaneously. Most English-speaking peoples and all mariners reckon from Greenwich; many countries reckon from their capitals. As the earth is a spherical body, measurements upon its surface are obtained by circular measurement. Latitude and longitude are so measured and are, therefore, expressed in degrees, minutes and seconds. The meridians or circles of longitude are widest apart at the equator and converge at the poles, being nowhere parallel; while the circles of latitude are at all points equidistant. A degree of longitude at the equator is 69.2 m. The distance between the meridians gradually diminishes with distance from the equator until at the poles there is no longitude. The greatest longitude a place can have is 180°, or halfway round the globe. (The greatest possible latitude is 90°, or one-fourth of a meridian circle, from equator to pole.) Longitude is used in dividing time. The length of time which it takes for the sun to cross one degree of longitude is four minutes; 15°, one hour; 360°, or the entire circuit, 24 hours. See LATITUDE; TIME, STANDARD; INTERNATIONAL DATE LINE.

**Long Parliament,** the name given to the last Parliament of Charles I of England. It began its session Nov. 3, 1640, and dissolved March 16, 1660. During the first few months the Star Chamber and other special courts were abolished, and a bill was passed preventing the dissolution of Parliament except by its own consent. The Irish rebelled in 1641, and a quarrel arose between the King and Parliament in regard to the control of the army sent to suppress the rebellion; this quarrel became the occasion for war with Charles. The Cavaliers, or King's men, left Parliament on the outbreak of the Civil War. The army was dissatisfied by concessions made to Charles by the Treaty of Newport (1648), and it expelled about 96 Presbyterian members. The 50 or 60 members left composed what is known as the "Rump Parliament," which executed Charles I and established the Commonwealth. It was in 1653 driven out by Cromwell and recalled after his death. The expelled members were reinstated, 1660. The Parliament then issued writs for a new election and dissolved itself March 16, of that year. See CHARLES I; CROMWELL, OLIVER.

**Long'spur",** a bird of the Finch Family, easily known by the extreme length of the nail of the hind toe. Excepting during the nesting season, these birds wander over the prairies and plains in immense flocks, feeding on seeds, grain and insects. The Lapland longspur is a little larger than the English sparrow. The neck and breast are black; the under parts, white; the back of the neck is crossed with bright chestnut; the upper parts are streaked with black, buff and white; the wings are blackish, with brown and white edgings; and the tail is dark brown. The nest is placed on the ground and is made of grass, lined with feathers. It contains three to six brown-speckled eggs. Smith's longspur may be distinguished from the Lapland by the brownish-buff under parts. These birds breed in the Far North, migrating in the winter to Texas, Kansas and Arizona.

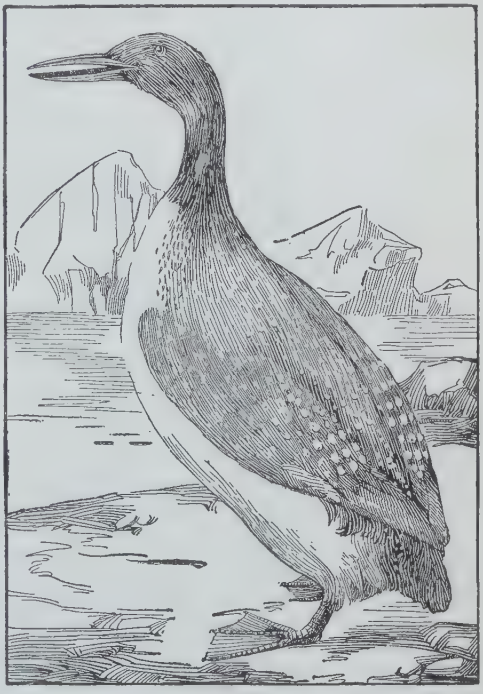
**Long'street, James** (1821-1904), an American soldier, born in South Carolina and educated at West Point. During the war with Mexico he was severely wounded and was brevetted captain and major for bravery. At the outbreak of the Civil War he entered the Confederate service, participating in the Seven Days' Battle, in the second Battle of Bull Run, where his timely arrival resulted in a Confederate victory; at Fredericksburg, Gettysburg, Chickamauga and in the Battles of the Wilderness. Throughout the struggle he was one of the ablest of Confederate leaders, and as Lee's "right-hand" man he rose to the rank of lieutenant-general. After the war he became a Republican. In 1880 he was appointed minister to Turkey, and from 1898 until his death he was United States commissioner of railroads.

**Lookout Mountain, Battle of,** a battle of the Civil War in which Hooker, with Federal troops, won a victory over a division of Confederate forces commanded by Rosecrans, Nov. 24, 1863. This was one of the engagements in the operations about Chattanooga, and, with the famous charge of Missionary Ridge, raised the siege of the city, forcing the retreat of the Confederate troops into Virginia. The Battle of Lookout Mountain is known as the "Battle Above the Clouds." See CHATTANOOGA, BATTLE OF.

**Loom.** See WEAVING, subhead *Loom.*

**Loon,** a bird of the Loon Family, also known as the great northern diver. It is about three feet long. The male is easily recognized by its velvety-black head and neck, which is somewhat greenish in certain lights; its white-streaked throat and white sides of the neck; its white breast; and its black, white-spotted back. It has a long bill, short legs and webbed feet. The nest is made in a lake and is frequently built on top of an old muskrat house. It contains two brown-spotted eggs. The young loons are downy and are able to care for themselves as soon as hatched. Loons are practically helpless on land, being unable either to run or fly. The water is their home, and they are the most expert swimmers and divers. The loon is famous for its loud, piercing cry, which to the timid sounds like the laugh of a demon.

LOON'S FOOT



GREAT NORTHERN DIVER

**Loose Constructionists.** See POLITICAL PARTIES IN THE UNITED STATES.

**Lope de Vega,** *Lo' pa da Va' gah.* See VEGA CARPIO, FELIX LOPE DE.

**Lo'quat,** a fruit-bearing tropical tree of the Rose Family, raised chiefly in Japan and southern China. Because of its fruit it has recently been introduced into California, where it is successfully grown. The tree is evergreen and, in cultivated species, is pruned to keep its height about 12 ft. The fruit is much like that of the pear, in shape, color and flavor, and is used for preserves and confections. The flowers of the loquat are large and white.

**Lorain', Ohio,** a city of Lorain Co., 27 m. w. of Cleveland, on the south shore of Lake Erie at the mouth of the Black River, which is navigable for large lake vessels for a distance of 4 m., and on the Baltimore & Ohio, the Lake Erie & Pittsburgh, the New York, Chicago & St. Louis, the Wabash and the Lorain & Ashland railroads. The city has 8 m. of harbor front and is an important port for several steamboat lines on the Great Lakes. It has a government breakwater and life-saving station. Lorain is a shipping port for the output of the central Ohio coal fields and for lumber, grain and iron ore of a large section of the state. Interurban and street-railway lines connect in all directions with the near-by towns and cities. The park system comprises six public parks with an area of 80 acres. The public buildings include a city hall, post office, Y. M. C. A. Building, good business houses, a number of fine banks, and about 37 churches.

The educational institutions include a fine system of public schools, many private and parochial schools and a free public library. Among the charitable institutions are St. Joseph's Hospital and the Social Settlement House. Lorain has extensive shipbuilding yards, vast steelworks, automatic-shovel works, stove works, gas-engine works and railroad shops. There is also efficient dock machinery for handling large cargoes of iron ore, lumber and coal. A trading post was established here in 1807, and the first permanent settlement was made in 1822. The place was incorporated as a village in 1836 under the name of Charleston. The present name was adopted in 1874 and a city charter granted in 1896. Population in 1910, 28,883.

**Lorenz,** *Lo' rents,* **Adolf** (1854- ), an Austrian surgeon. After his graduation from the University of Vienna in 1880, he became assistant to the professor of surgery in that institution. Advised to take up the prevention of deformities, he experimented many years before developing the fact that, by manipulation alone, he could reduce the dislocation of the hip joint. He demonstrated his method at a medical congress in Berlin in 1895, and became famous. In 1902 he visited the United States and England, demonstrating in both countries. Another of his operations straightens clubfoot. He has invented several instruments and is the author of various publications.

**Lor'imer, George Horace** (1868- ), an American editor and author, born in Louisville, Ky., and educated at Colby and at Yale. He originally engaged in business, later entering newspaper work and in 1899 becoming editor of *The Saturday Evening Post.* Since then he has written *Letters from a Self-Made Merchant to His Son, Old Gorgon Graham, The False Gods* and *Jack Spurlock—Prodigal.*

**Lorne, Marquis of.** See ARGYLL, JOHN DOUGLAS SUTHERLAND CAMPBELL.

**Los Angeles,** *Lose An' gel es,* **Cal.,** a city and county seat of Los Angeles Co., on the Los Angeles River 20 m. from its mouth, 484 m. s.e. of San Francisco and 781 m. s.w. of Salt Lake City, on the Southern Pacific, the Atchison, Topeka & Santa Fe, the San Pedro, Los Angeles & Salt Lake railroad systems and their branches. The city is located immediately south of the Sierra Madre range of mountains and 15 m. e. of the Pacific Ocean. Los Angeles is an important seaport. By annexation San Pedro and Wilmington are within the city limits, the San Pedro Harbor becoming the harbor of the city. The expenditure of about $3,000,000 by the Federal Government on the breakwater and the dredging of the inner channels gave the city one of the finest harbors in the world. The area of the harbor is 575 acres and the breakwater is 11,000 ft. in length. Steamship lines are in operation from Los Angeles to San Francisco, Portland and Seattle, and to the Hawaiian Islands, China and Mexico. The opening of the Panama Canal will greatly extend the commerce not only of Los Angeles but of all the cities of the western coast. Los Angeles is known as

LOS ANGELES

the metropolis of the Southwest. The area of the city is over 101 sq. m. and the average elevation is 270 ft. The southern and southwestern portions of the city are level. Across the river are Boyle Heights, East Los Angeles, Highland Park and Garvanza. The street-railway system is very complete. There are suburban lines to Santa Monica, Redondo, Long Beach, Newport, Huntington Beach, Pasadena, San Pedro, Alhambra, Santa Ana and many other towns and cities. The suburban electric lines radiating from the city aggregate about 900 m. of track. Inclined railways ascend Court Street and Third Street hills in the heart of the city. The city has important horticultural, fruit-shipping and petroleum interests, and the area of land within the county devoted to horticultural purposes is rapidly extending. Los Angeles has acquired valuable water rights extending along the banks of the Owen River in Inyo County. This water will be brought to the city, a distance of 240 m., by means of an aqueduct and 20 m. of tunnels. The cost of the enterprise is estimated at $25,000,000. All of the water in excess of the needs of the city may be used for irrigation.

Streets, Parks and Boulevards. Los Angeles has 23 public parks within the city limits, aggregating over 3780 acres. In the park system are Westlake, Eastlake, Prospect, Central, Hollenbeck, Echo, Sunset, South, Elysian, Griffith and Exposition parks. There are also seven playgrounds, excellent golf links and nine vacation or summer centers. The thousands of beautiful homes are among the chief attractions of the city. The mildness of the climate permits plants and flowers to flourish in the open air throughout the winter. The streets are shaded with many varieties of trees, which include the graceful pepper, palm, eucalyptus, orange, acacia, grevillea and camphor.

Public Buildings. Among the noteworthy public buildings are the Federal Building, courthouse, city hall, County Hall of Records, a public library, Exposition Building, Chamber of Commerce with an exhibit hall, Art Museum, Auditorium, California, Concordia and Union League buildings, Blanchard Art Building, Y. M. C. A. and Y. W. C. A. buildings, about 40 banks, scores of fine business blocks, many elegantly-equipped hotels, which include the Lankershim, Alexandria and Van Nuys, 16 theaters and about 225 churches of all denominations, including Old Mission cathedrals as well as those of handsome modern architecture.

Institutions. Los Angeles is a college and university center. The University of Southern California (Methodist) is heavily endowed and finely equipped. Occidental College (Presbyterian) is a popular institution of higher education. Other institutions include the McClay College of Theology, St. Vincent's College (Catholic), a state normal school, military academies for boys, collegiate schools for girls, business colleges and many private schools. The Polytechnic High School, built of white granite and marble, occupies a block at the head of Hope Street. The city contains over 115 school buildings. The benevolent and charitable institutions include a number of hospitals, orphanages and homes for the aged and friendless. The Soldiers Home is located at Sawtelle, an attractive suburb of the city.

Industries. The wealth and general prosperity of Los Angeles are founded largely upon the abundant natural resources. The horticultural products include everything that can be raised in semitropic countries. The choicest fruit land is largely devoted to the raising of oranges, lemons, grapefruit, peaches, prunes, grapes, olives and a great variety of small fruits. A number of the land sections are all-round farming regions, producing large quantities of pork, butter, cheese, corn and vegetables. The canning and preserving of fruits and vegetables are important industries. Flowers, bulbs and seeds are shipped East in large quantities. Ostrich raising, slaughtering and meat packing, lumber manufacturing and planing, wine and brandy

making, and flour and grist milling are also profitable industries. Rich oil-producing sections are in the western section of Los Angeles City, at Sherman, Puente, Whittier, Fullerton and Newhall, and in Kern, Ventura, Santa Barbara and San Luis Obispo counties, with an estimated yield of about 85,000,000 barrels annually. The refineries also handle an immense amount of crude products in the manufacture of lubricants, asphalt, coke and distillates.

History. The first settlement was made in 1781 by a number of colonists who had been recruited in the Mexican states of Sonora and Sinaloa under protection of the Spanish governor. The pueblo, or town, was named by this band *Nuestra Señora la Reina de los Angeles*—Our Lady, the Queen of the Angels. The first census of the little city in 1790 gave the population as 141. The census of 1880 gave the city a population of 11,311. Five years later, the last spike was driven in the Atlantic and Pacific Railroad. From that time the growth of the city has been rapid. Los Angeles is cosmopolitan, every state in the Union and almost every country in the world being represented. Population in 1910, 319,198.

**Los'sing, Benson John** (1813-1891), an American historian, born in Beekman, N. Y. In early life he was a watchmaker in Poughkeepsie, N. Y.; but when he was 22 years of age he became part owner and editor of the Poughkeepsie *Telegraph*. Later he went to New York City, where he edited the *Family Magazine*. Lossing began publishing books in 1841. At first he published illustrated works of a popular nature; but the historical studies involved in his work led him to further investigation in that line, resulting in his historical writings. Among his works may be mentioned *Pictorial Field Book of the Revolution, The Hudson from the Wilderness to the Sea, Pictorial Field Book of the Civil War, Pictorial Field Book of the War of 1812, History of New York City*, a series of histories for the public schools and a large United States history.



**Lo'tus,** or **Nelum'bo,** a plant of the Water Lily Family, closely resembling the water lily in habit of growth; it has long, slender stems and leaves, which rise from creeping rootstocks buried in lake or river bed, and spread flat upon the surface of the water. The buds are long and pointed and are concealed by three dark green sepals, which slowly open, disclosing many petals and stamens and a thick, fleshy pistil. The flowers differ in color according to the variety of the plant; the sacred lotus was probably yellow, the lotus of the Nile is blue, others

LOTUS

are white with yellow centers. Historically, the lotus is of especial interest since its spreading petals are responsible for many of the designs of Egyptian art. Its golden-yellow color made it a symbol for the sun worshipers and elsewhere in legend it is said to be the attribute of silence, the cradle of Moses, the throne of Buddha and the type of the creation. It is still used in Buddhist ceremonials and Japanese feasts, and is the national flower of both Egypt and India. In the United States there are many lotus beds which attract great interest. Chief among them are those of New York City, Monroe, Mich., and Grass Lake, Ill.

Other plants, such as the yellow pond lily, the bird's-foot trefoil and a tree of the Nettle Family, are also called lotus. From the latter plant a wine is said to have been prepared which rendered the one who quaffed it dreamily content and forgetful of home ties; such people were called the lotus-eaters, or the lotophagi.

**Lotze,** *Lote' se,* **Rudolf Hermann** (1817-1881), a German philosopher, born at Bautzen in Saxony. He studied philosophy and medicine at Leipsic, and in 1842 became professor of philosophy in that university. Two years later he succeeded Herbart in the professorship at Göttingen. Here he remained for 37 years and did practically all of his work. Lotze's philosophy attempts to reconcile mechanism and teleology; that is, to show that a scientific explanation of things does not exclude the idea of purpose. Indeed the opposite is true. The fact that things are not independent, but are essentially related, is proof of purpose in the world. Lotze's teleological idealism is ethical rather than intellectual. He is influenced by the demands of his feelings quite as much as by the requirements of logic. The universe has its cause in the Good, which underlies all the phenomena and activities of the world. Lotze was one of the most influential philosophers of the latter half of the 19th century. Among his works are *Metaphysics, Logic* and *History of Æsthetics in Germany.*

**Loubet,** *Loo" beh',* **Emile** (1838- ), a president of the French Republic, born at Marsanne. He entered the legal profession and rose rapidly in public favor. In 1876 he was made a member of the Chamber of Deputies, entered the Senate in 1885, and became its president, and also president of the council. In 1887 he had charge of public works, and in 1899 was elected president of France, continuing in this position until 1906. His administration was marked by the initiation of the movement which resulted in the law (1905) separating Church and State. He was succeeded in the presidency by Clément Fallières.

**Louis,** *Loo' is,* the name of 18 kings of France. Louis I, surnamed *le Débonnaire,* born in 778, was Holy Roman emperor, succeeding his father, Charlemagne, in 814, at the same time becoming King of France. His reign lasted until his death in 840. Louis II, born in 846, son of Charles the Bald, reigned from 877 until his death in 879. Louis III, born about 863, son of Louis II, succeeded his father in 879 and died in 882. Louis IV, born in 921, reigned from 936 to 954. Louis V, the last of the French Carolingian kings, born in 967, succeeded his father Lothair as king in 986, and reigned one year.

Louis VI, born about 1080, succeeded his father Philip I in 1108, and reigned until 1137. By his quarrel with Henry I of England, the struggle between the two countries was begun which continued for three centuries. Louis VII, born about 1120, son of Louis VI, succeeded his father in 1137, and reigned until 1180. He engaged in the Second Crusade. The marriage of his divorced Queen, Eleanor of Aquitaine, to Henry II of England, taking with her as dowry the provinces of Poitou and Guienne, caused a long war between England and France. Louis VIII, born in 1187, son of Philip Augustus, succeeded his father in 1223, and reigned until 1226. He regained most of the English possessions in France, and led a crusade against Raymond of Toulouse and the Albigenses.

Louis IX, called St. Louis, born in 1215, son of Louis VIII, succeeded his father in 1226. He defeated Henry III of England in several engagements in 1242. In fulfillment of a vow he undertook a crusade to Palestine in 1248 with an army of 50,000, but was defeated and captured and forced to pay a heavy ransom. Returning to France in 1252, he devoted the next 15 years to establishing justice and prosperity throughout his country by reforming the nobility and the laws, and lightening the burdens of the people. In 1270 he undertook a second crusade, but died of a pestilence before reaching Palestine. Louis X, born

in 1289, son of Philip the Fair, succeeded his father in 1314 and reigned for two years.

Louis XI, born in 1423, son of Charles VII, succeeded his father in 1461, and reigned until 1483. He increased the territory of France and curtailed the power of the nobles, besides strengthening the power of the throne. Unscrupulous and cruel, he nevertheless furthered the interests of his kingdom by encouraging manufactures, commerce and education. Louis XII, born in 1462, son of Charles, Duke of Orleans, succeeded Charles VIII as king in 1498, and reigned until 1515. His reign was continually disturbed by wars with Italy, England, and the Holy League formed by Venice, Ferdinand of Aragon, the Pope and Henry VIII of England. Louis XIII, born in 1601, was the son of Henry IV, whom he succeeded under the regency of his mother, Maria de' Medici, in 1610. In 1624 he chose Richelieu as his prime minister, and the remainder of his reign was practically that of the great Cardinal. The political power of the Huguenots was broken and the governmental power was centralized. See RICHELIEU, ARMAND JEAN.

Louis XVII, born in 1785, died in 1795, second son of Louis XVI, was proclaimed king by the Royalists upon the death of his father in 1793, but never reigned. Louis XVIII, born in 1755, brother of Louis XVI, led a wandering life until the fall of Napoleon opened the way to the throne. He reigned from 1814 until his death in 1824. See LOUIS XIV; LOUIS XV; LOUIS XVI.

**Louis XIV** (1638-1715), King of France and successor to his father, Louis XIII. He became king when he was but five years of age, and during his minority his mother, Anne of Austria, acted as regent, while public affairs in general were administered by the premier, Mazarin. During these early years of his reign the French were carrying on a series of brilliant campaigns against Spain, but internal affairs were less fortunate, and at one time Anne, with Mazarin and the young King, was obliged to flee from the capital. Upon the death of Mazarin, Louis XIV began to rule, and his autocratic though prosperous reign is typified in his famous sentence *L'état c'est moi.* (I am the state.) The early part of his reign was wisely spent in improving the financial conditions of France, and industries were encouraged by a high protective policy. His foreign policy, however, involved France in a series of wars which, in his later years, he deeply regretted. Through the influence of the Queen, Maria Theresa, he revoked the Edict of Nantes and thus drove from France many of her most industrious and able workmen. By accepting the Spanish crown for his grandson, Philip of Anjou, Louis renewed the hostilities that had ceased with the Peace of Ryswick (1697), and entangled his country in difficulties which ended in her complete humiliation in the war that ensued (See SPANISH SUCCESSION, WAR OF THE).

During this time the French court was the most brilliant in all Europe and Louis's reign was made forever famous by the great men he drew around him. It was the age of Corneille, Molière and Racine in literature; of Lebrun, Poussin and Claude Lorrain in painting; and of Turenne and Condé in warfare. These names, the munificence of the King, and the splendor of the court have caused these years to be known as the Golden Age of France.

**Louis XV** (1710-1774), King of France, succeeded his great-grandfather, Louis XIV, in 1715, under the regency of the Duke of Orleans. He became ruler in fact in 1723. He married the daughter of the dethroned King of Poland, and became involved in war in support of his father-in-law's claims. In 1726 he made his tutor, Cardinal Fleury, his prime minister, who held this position until 1743. The War of the Austrian Succession (1740-1748), in which Louis became involved, resulted favorably to France and restored her lost colonies. But the Seven Years' War (1756-1763) was carried to America and cost France the loss of Louisiana and Canada.

**Louis XVI** (1754-1793), King of France during the French Revolution. In his youth he was little in sympathy with the intrigues and corruption of the French court and lived much by himself, interested chiefly in mechanic arts. In 1770 he married Marie Antoinette, the Archduchess of Austria, and in 1774, upon the death of his grandfather, he became king. His reign began auspiciously, for he set in operation many governmental reforms, court economies and personal philanthropies. He appointed Turgot minister of finance, and once more convened the Parliament. The tide of prosperity was turned by the financial embarrassment suffered through aid given to the American colonies against England, and by the opposition of the Queen to the most of the reform measures. A growing and dangerous spirit of republicanism began to threaten the monarchy, and the culmination was reached when, after the forced resignation of two inefficient ministers, Necker and Calonne, Louis's attempt to dissolve Parliament was met with defiance by Mirabeau, acting in the name of the people. In spite of the King's efforts to conciliate the people, Paris was soon filled with an infuriated mob which stormed the Bastille and later surrounded the royal palace at Versailles, compelling the King and the royal family to return to the Tuileries, where they were kept under strict guard. In an attempt to escape, the king was recaptured, was tried for conspiring against the constitution and was condemned to death. He was executed in January, 1793. See FRENCH REVOLUTION.

**Louisburg,** *Loo' is burg,* **Sieges of,** two famous sieges about the village of Louisburg, Cape Breton Island. The French had made Louisburg the strongest coast position in the New World. Nevertheless, it surrendered to a force of British and New England troops, June, 1745, during King George's War. The position was restored by the Treaty of Aix-la-Chapelle, 1748, but in July, 1758, during the Seven Years' War, it was again taken. The British subsequently destroyed the fortifications. Louisburg is situated in the southeastern part of Cape Breton Island. It has an excellent harbor, which is of importance as a shelter for vessels.

**Louisiana,** *Loo e" ze an' a,* THE CREOLE STATE, one of the South Central States and one of the Gulf States, is bounded on the n. by Arkansas and Mississippi, on the e. by Mississippi, on the s. by the Gulf of Mexico and on the w. by Texas.

SIZE. The greatest length from north to south is 280 m., and from east to west, 290 m. The area is 48,506 sq. m., of which 3097 sq. m. are water. Louisiana is a little smaller than New York, about the size of Mississippi and Delaware combined and the 30th state in area.

POPULATION. In 1910 the population was 1,656,388. From 1900 to 1910 there was a gain in population of 274,763, or 19.9 per cent. There are 36.5 inhabitants to the square mile and the state's rank in population is 24.

SURFACE. Along the Arkansas border are elevations from 400 to 500 ft. high. From these altitudes the surface slopes gradually southward to meet the sea. The region between the Mississippi and Sabine rivers is a flat country crossed in the northern part by the Ouachita and Red rivers, whose valleys are separated by a low divide. The land along the Mississippi and in the southern part of the state is low and flat. In many places the farms are protected from overflow from the river by levees. This part of the state is of recent formation and consists of land formed from the silt brought down and deposited by the river. The delta of the Mississippi extends far out into the Gulf, and is growing in this way year by year. The coast is bordered by marshes and lagoons of brackish water, some of which are so enclosed as to form lakes.

RIVERS AND LAKES. The Mississippi forms the northern part of the eastern boundary, then crosses the southern half of the state in an irregular southeast course. The river here has its largest volume of water, and exerts a powerful

influence on the country bordering on its banks. The Ouachita crosses the northern boundary a little east of the center and flows southward, uniting with the Red just above where that stream enters the Mississippi. The Red River, next to the Mississippi the most important stream, enters the state near the northwest corner and flows diagonally across it to the southeast, uniting with the Mississippi where that stream begins to cross the state. The Sabine forms about two-thirds of the western boundary and flows directly into the Gulf. The Bœuf in the northeast and the Little Saline in the central part of the state are important tributaries respectively of the Ouachita and the Red. The streams in the southern part of the state are relatively short. All of the rivers are sluggish and flow through tortuous channels.

Louisiana has a large number of lakes. However, most of them are bayous or lagoons. The latter are found along the rivers and are formed by a change in the channel of the stream. They are usually long and narrow and have the form of the arc of a circle.

Climate. Louisiana has a semitropical climate with hot summers and warm winters, except in the northern part of the state, where the thermometer may fall several degrees below freezing point. Here, however, there are only three months in which frost occurs. The rainfall varies from 60 inches in the southeast to 50 in the north.

Minerals and Mining. During the Civil War a deposit of salt was discovered in Petite Anse Island and it has been worked ever since. In some places this deposit is over 1000 ft. thick, and the salt is of remarkable purity. Other deposits have also been discovered on Orange Island. Near Lake Charles are extensive beds of sulphur. The beds are several hundred feet underground, and the sulphur, which is 99 per cent pure, is obtained by superheated water forced through the beds by compressed air. The dissolved sulphur is brought to the surface, where it is cooled in large tanks in the open air. Next to the sulphur mines in Sicily these are the most important mines in the world. Petroleum is found in several places and the Jennings oil field is one of the largest in the country. Natural gas occurs north of Shreveport. Some kaolin and iron ore are found in the state.

Forests and Lumber. The uplands contain extensive forests of long-leaved and short-leaved pine, and in the lowlands are forests of red and white cypress. Ash, oak, beech, walnut and other trees are found on the bluffs along the rivers. Louisiana has a good supply of forest and timber, and lumbering is one of the important industries of the state.

Agriculture. The soil of most of the state is a deep, rich alluvium capable of producing abundant crops of whatever can be grown in a warm temperate or semitropical climate. Cotton and sugar cane are the two great staples. The annual yield of cotton is about 700,000 bales. This is grown mostly on the uplands. Sugar cane is raised in the southern part of the state, and three-fourths of all that is produced in the United States is grown in Louisiana, making this the leading state in the production of sugar (See Sugar). On the lowlands west of the Mississippi and bordering the Gulf there are extensive rice fields, and Louisiana is the leading state in the production of this cereal. Corn is grown in all parts of the state for home consumption. In the northern part fruits are raised for the Northern markets. Dairying is increasing in importance and sufficient live stock is raised to supply local needs.

Fisheries. Louisiana is the second only to Florida among the Gulf States in the value of her fisheries. The oyster fisheries are of chief importance and are second only to those in Chesapeake Bay. The principal beds extend from the mouth of the Atchafalaya River to the state line. Shrimp and catfish are also taken in large numbers. Alligators are caught for their hides.

Manufactures. The production of sugar is the chief manufacturing indus-

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try and it contributes about two-fifths of the value of the manufactured products of the state, the annual output amounting to about $48,000,000. The manufacture of lumber and lumber products is second in importance. The other industries include the manufacture of cottonseed oil and cake, cleaning and hulling rice, refining cottonseed oil, the manufacture of fertilizer from cottonseed, making and repairing railway cars, making machinery and the manufacture of cotton goods. New Orleans is the chief manufacturing center.

Transportation and Commerce. Including the Mississippi, Louisiana has over 3700 m. of navigable rivers. The Red, Ouachita, Sabine and Atchafalaya are all navigable. Railroads extend across the state from east to west and from north to south. The most important systems are the Illinois Central, the Louisiana Railway & Navigation Company, the Southern Pacific, the Texas Pacific, the Louisiana & Nashville and the Queen & Crescent. New Orleans is the chief railroad center and the chief river port and seaport.

The commerce of the state is extensive because New Orleans is the chief port for a large amount of trade that comes down the Mississippi from the states farther north. Sugar, cotton, lumber, fruits, salts, sulphur and petroleum are exported. Manufactured goods and foodstuffs are imported.

Government. The present constitution adopted in 1898 has been amended several times, the last amendment being in 1910. The executive department consists of a governor, lieutenant-governor, secretary of state, auditor and treasurer, each elected for four years. The Legislature consists of a Senate of 41 members and a House of Representatives that cannot exceed 116 members, all elected for four years. Sessions of the Legislature are biennial and limited to 60 days.

The judicial department comprises a Supreme Court of one chief justice and four associate justices elected for 12 years, and a Court of Appeals consisting of three judges elected from three separate districts. The state is divided into four Supreme Court districts, and 32 judicial districts in which the district judges hold court.

Education. The public schools are in charge of a state board of education, consisting of the governor, superintendent of education, attorney-general and seven other members appointed by the governor. A board of education for each parish is elected, whose members serve for four years. The parish board appoints a county superintendent. The school fund is derived from state and local taxation. Separate schools are provided for white and colored children. Since 1890 the schools have made rapid advancement. Graded schools with high schools are maintained in the large cities and towns. There is a state normal school at Natchitoches and a city normal school at New Orleans. The Louisiana Industrial Institute at Ruston, Southwestern Industrial Institute at Lafayette and Southern University for colored students at New Orleans are state institutions. The state university and agricultural college is at Baton Rouge, and is at the head of the educational system. The higher institutions not under control of the state are Centenary College at Shreveport; and Tulane and Marquette universities at New Orleans.

State Institutions. The hospitals for the insane are at Jackson and Pineville. Charity hospitals are maintained at New Orleans and Shreveport. The state schools for the deaf, dumb and blind are at Baton Rouge.

Cities. The chief cities are Baton Rouge, the capital; New Orleans, Shreveport, New Iberia, Lake Charles, Alexandria and Monroe.

History. Louisiana, named for Louis XIV of France, was first visited in 1519 by Alonso Alvarez de Piñeda, who entered the mouth of the Mississippi. In 1541, De Soto explored the land on both sides of the river above the present site of Baton Rouge. In 1682 La Salle, sailing down to the Gulf, from Canada, claimed the country in the name of

France. D'Iberville made the first permanent settlement at Biloxi (now Ocean Springs, Mississippi), in 1699. The next year a fort was established, 70 m. up the Mississippi, to block the passage of the English. Crozat, who in 1712 had been given Louisiana and exclusive control thereto, relinquished it in 1718 to the Mississippi Company, or Company of the Indies, organized by John Law.

Bienville was made governor. Moving from Biloxi, he founded New Orleans in 1718. In 1733 Louisiana was declared a royal province. Thirty years later, by a secret treaty, France gave to Spain New Orleans, the island on which it stands and all her land west of the Mississippi. That same day she ceded to Great Britain all her remaining American territory. In 1800, by cession from Spain, France again possessed Louisiana (west of the Mississippi). In 1803 Napoleon sold this territory to the United States for $15,000,000.

Reduced to its present bounds, Louisiana became a state in 1812. In the war of that year, General Jackson and 5000 men defended New Orleans from the English (See NEW ORLEANS, BATTLE OF). In 1852 Baton Rouge became the capital. Louisiana seceded in 1861. As the Union forces occupied New Orleans after May, 1862, the state's commercial sufferings from the Civil War were severe; moreover, after the war, its political and economic reconstruction was slow. Finally, in 1868, the Fourteenth Amendment was agreed to and in 1879 a new constitution was adopted. In 1884 the New Orleans Exposition took place. Since the adoption of the new constitution in 1898 the state has made steady progress in the development of her resources and along educational lines.

GOVERNORS. William C. C. Claiborne, 1812-1816; Jacques Villeré, 1816-1820; Thomas B. Robertson, 1820-1822; Henry S. Thibodaux, 1822-1824; Henry S. Johnson, 1824-1828; Pierre Derbigny, 1828-1829; Armand Beauvais and Jacques Dupré, 1829-1831; André B. Roman, 1831-1835; Edward D. White, 1835-1839; André B. Roman, 1839-1843; Alfred Mouton, 1843-1846; Isaac Johnson, 1846-1850; Joseph Walker, 1850-1853; Paul O. Hébert, 1853-1856; Robert C. Wickliffe, 1856-1860; Thomas O. Moore (Confederate), 1860-1862; George F. Shepley (Union military governor of New Orleans), 1862-1864; Henry W. Allen (Confederate), 1864-1865; Michael Hahn (Union governor of New Orleans), 1864-1865; James M. Wells, 1865-1867; Benjamin F. Flanders (military governor), 1867; Joshua Baker (military governor), 1867-1868; Henry C. Warmoth, 1868-1873; Pinckney B. S. Pinchback, 1873; John McEnery, 1873; William P. Kellogg, 1873-1877; Stephen B. Packard, 1877; Francis T. Nicholls, 1877-1880; Louis A. Wiltz, 1880-1881; Samuel D. McEnery, 1881-1888; Francis T. Nicholls, 1888-1892; Murphy J. Foster, 1892-1900; William W. Heard, 1900-1904; Newton C. Blanchard, 1904-1908; Jared Y. Sanders, 1908-1912; Luther E. Hall, 1912—. Governors are ineligible for immediate reelection.

**Louisiana Purchase,** the purchase by the United States from France in 1803 of the territory known as the Province of Louisiana. News reached the United States in the spring of 1802 that Spain, by the secret Treaty of San Ildefonso concluded in 1800, had returned Louisiana to France. This announcement caused uneasiness on the part of American statesmen, as they felt that this move revealed the policy of France to regain her foothold in America. President Jefferson was alarmed at the prospect of danger arising from the proposed transfer and declared in his annual message that the day France took possession the friendship then existing between France and the United States would be at an end, and that the United States must henceforth ally herself with the British nation. The President also wrote to the American minister at Paris, Robert R. Livingston, that if France considered Louisiana indispensable to her interests she might cede the Island of New Orleans and the Floridas to the United States.

In January, 1803, James Monroe was selected to act as minister-plenipotentiary with Livingston. The war between England and France had been renewed, and Napoleon doubted the ability of France to hold his territory in America against such a power; he therefore, through Talleyrand, proposed to sell the entire Province of Louisiana. An agreement was finally made by the promise of the United States to pay 80,000,000 francs ($15,000,000) to France, this sum to include 20,000,000 francs ($3,750,000) for the debts of Americans to French citizens, which the United States was to assume. The agreement was signed Apr. 30, 1803, and ratified Oct. 20.

The treaty provided that the people of Louisiana should have full rights and enjoyment of citizens of the United States, and that the ships of both Spain and France should for 12 years enjoy special privileges of entry at New Orleans. The total cost to the United States was about $27,267,000, and the area purchased exceeded 1,000,000 sq. m. It included nearly all the area that now constitutes 13 states, with a population in 1910 of about 15,000,000. See UNITED STATES, subhead *Acquisition of Territory*.

**Louisiana Purchase Exposition,** an international exposition held in the city of St. Louis, Mo., from Apr. 30 to Dec. 1, 1904, having for its object the celebration of the 100th anniversary of the transfer of the territory of Louisiana from France to the United States. In April, 1901, the Louisiana Purchase Exposition Company was incorporated with a capital of $6,000,000 and a site selected for the great fair in Forest Park, a tract of 1142 acres within the western limits of the city. The architectural plan comprised 15 exhibition buildings, which were so laid out as to produce an excellent artistic effect. Thirty-four states and territories made appropriations amounting to nearly $5,000,000, part of which was expended in special buildings. The National Government also appropriated $5,000,000. Foreign governments were largely represented and many of them erected structures of considerable beauty and originality. The total cost to the exposition company before the fair opened was nearly $20,000,000. The total attendance was about 21,000,000; the receipts, including congressional, state and municipal appropriations, were $31,586,333, and the disbursements $30,657,861.

**Louisiana State University and Agriculture and Mechanical College,** at Baton Rouge (1860). This institution was established in 1855 as the State Seminary of Learning; and opened in 1860, at Alexandria. Suspended during the Civil War, it was removed to Baton Rouge in 1869; and in 1877 the agricultural college, opened at New Orleans in 1874, was merged with the university. It maintains experiment stations at Baton Rouge, New Orleans and Calhoun, has a library of some 30,000 volumes and in 1910 reported over 600 students. It is not open to women. See TULANE UNIVERSITY OF LOUISIANA.

**Louis Napoleon.** See NAPOLEON III.

**Louis Philippe** (1773-1850), King of France from 1830 to 1848. He was the eldest son of Duke Louis Philippe Joseph of Orleans and Princess Louise Marie Adelaide. He was well educated and early entered the National Guard, where he won some renown for his military service. Because he was believed to be interested in a conspiracy to place himself upon the throne, the arrest of Louis was ordered, but he fled to Austria, where, unrecognized, he secured a position as a teacher. Later he traveled in the United States and England, returning to France only after the downfall of Napoleon and the accession of Louis XVIII. He was not cordially welcomed at court until after the coronation of Charles X, with whom he maintained pleasant relations. After he became king in 1830, France enjoyed unusual prosperity in industrial lines, but Louis's policies made him hated by the extremists of France and distrusted by foreign powers. When he and his minister Guizot opposed certain electoral reforms, an insurrection broke out (1848)

which drove him from the throne. He spent his remaining years in England.

**Louisville,** *Loo' is vil,* **Ky.,** a city, county seat of Jefferson Co. and commercial metropolis of the state, 110 m. s.w. of Cincinnati. Louisville is situated on the Ohio River and on the Baltimore & Ohio Southwestern, the Illinois Central, the Chesapeake & Ohio, the Pittsburgh, Cincinnati, Chicago & St. Louis, the Louisville & Nashville, the Louisville, Henderson & St. Louis, the Big Four and the Monon railroads. A number of steamboat lines connect the city with Memphis, Cairo, Cincinnati and Evansville, and other river ports of the Ohio and of the Mississippi valleys. There is an extensive system of street-railway and interurban electric lines. The Ohio is here spanned by three bridges, and there is a ferry connecting Louisville with Jeffersonville, a handsome residential suburb. In 1830 the Louisville and Portland Canal, nearly two miles long, was constructed around the rapids on the Kentucky side, for use at time of low water. In 1874 this canal passed under Federal control. The excellent transportation facilities and the richness of the surrounding region in agricultural products and in coal and iron have made Louisville an important manufacturing and industrial city.

Parks and Boulevards. Louisville has an extensive park system, organized in 1891. Third Street Boulevard extends from the center of the city to Iroquois Park of 670 acres; Cherokee Park of 730 acres lies at the east end of Broadway, and Shawnee Park lies at the west end. Central Park of 18 acres, and Boone and Baxter squares occupy a place in the old residential districts. The newer residences are on the highlands at the east and west ends of the city. The streets intersect at right angles and are generally wide and beautifully shaded. The numerous handsome residences are surrounded by well-kept lawns and gardens. The wholesale district and the great tobacco warehouses are not far from the river and lie along Main Street, which runs east and west. The shopping district is along Fourth Street in the heart of the city. There is practically no tenement district, as a large per cent of the wage earners own their homes or rent small cottages.

Public Buildings. The most noteworthy public building is the courthouse, containing a marble statue of Henry Clay, by Joel T. Hart. A bronze statue of Thomas Jefferson, designed by Moses Ezekiel, stands in front of the building. Other prominent buildings are the city hall, the Federal Building and the city public library. The city also contains a large number of banks, fine hotels, theaters, substantial business houses and about 240 churches, many of which are fine specimens of ecclesiastical architecture. Several imposing Catholic cathedrals add to the beauty of the city.

Institutions. The chief educational institution is the University of Louisville, with law and medical departments and a College of Liberal Arts. Among other educational institutions are the Southern Baptist Theological Seminary, the Louisville College of Pharmacy, the Presbyterian Theological Seminary of Kentucky, the Louisville College of Dentistry, the male and female high schools, a manual-training school, a normal school and about 25 Catholic schools. The benevolent and charitable institutions include the Kentucky Institute for the Blind, in connection with which is the American printing house for the blind; the Children's Free Hospital, a number of state hospitals and many private charities.

Industries. The leaf-tobacco market of Louisville is the largest in the world. There is also a notably large trade in pork, wheat, corn, coal and lumber. There are extensive manufactories of packed meat, men's clothing, cottonseed oil and cake, agricultural implements, wagons and carriages, sole leather, cast-iron pipes and plumbers' supplies, brass fittings, furniture, cement and other manufactured products. Louisville is one of the greatest distilling centers in the country and an important market for live stock.

HISTORY. The first settlement was made in 1778 by about 20 families who came down the river under the leadership of Col. George Rogers Clarke. The city of Louisville was founded the following year and named in honor of Louis XVI of France. The first city charter was granted by the Kentucky Legislature in 1828. On account of its excellent transportation facilities and superior location, the city has had a rapid growth. Population in 1910, 223,928.

**Louse,** a family of disgusting and annoying parasites of the order Hemiptera. The most uncomfortable of these are the body louse and the head louse, which are parasitic upon man. They attach their eggs to the base of the hair or to the clothing and hatch there into tiny insects which from the first closely resemble the adult. They are flat-bodied, short-legged creatures, with short antennæ, broad heads and bulging eyes. Since these pests live only upon dead tissue, cleanliness is the surest preventive. Infested houses may be cleansed by closing them tightly for 24 hours and evaporating a few ounces of carbon bisulphide within. This kills the insects but not the eggs, so the process should be repeated after a week's interval.

Lice which infest birds, poultry and domestic animals, belong to a closely related family. Plenty of fine dust in cages and roosts aid the birds, chickens and turkeys in destroying the pests which annoy them. Horses, cows and such farm animals may be well groomed and then brushed with a kerosene emulsion diluted five times, or painted with a carbolic or tobacco wash. Where the infested herd is large, a spray of the emulsion (diluted nine times) may be employed while allowing the herd to pass singly through a narrow gateway. This process should be repeated at weekly intervals until the pest disappears. The plant lice, or aphids, belong to another division of this same order. See APHID; INSECTICIDE.

**Louvre,** *Loo' vr',* **Palace of the,** a group of magnificent buildings in Paris, built in the center of the city, on the north bank of the Seine. The main building was begun in 1204, and was early used as a fortress, prison and arsenal, occasionally also as a royal residence. Francis I reconstructed the building in 1541, and employed Jean Goujon, one of the most famous decorative sculptors of the French Renaissance, to do the work. His plans were naturally left incomplete and the work was continued by several successive French kings. At the time of the French Revolution, Napoleon I turned it into a national gallery and museum, when he returned from Italy with the rich, artistic spoils which he had captured, and the whole was magnificently completed by Napoleon III. It contains the most valuable treasures in any one building in the world. All departments of the institution are in the hands of specialists and have been carefully catalogued and arranged. Since 1882 a school has been maintained in connection with the Louvre, and advanced courses are offered in archæology and art.

**Love Bird,** a name given to the smallest of the parrots, which do not exceed six inches in length. Their name was given them because of the affection displayed toward each other. They are inhabitants of Africa, and about nine species are known. The tail is very short and the bill is very thick and deep. A species common in zoological gardens is the rosy-faced love bird. It is pale green, with red forehead and eyebrows, rosy neck and face; the tail is scarlet, with green and black termination; and the rump and upper tail coverts are a rich blue. They build no nest of their own, but deposit the pure white eggs in the nests of other birds.

**Lovejoy, Elijah Parish** (1802-1837), an American abolitionist, born at Albion, Me. He graduated at Waterville College in 1826, at Princeton Theological Seminary in 1833, and entered the Presbyterian ministry, soon becoming editor of the *St. Louis Observer,* a journal of that denomination. This he made a strong anti-slavery publication. Because of the opposition of the slavery element

in St. Louis, he removed his plant to Alton, Ill., where it was three times destroyed by mobs. Upon the fourth attack, Nov. 7, 1837, he was shot and mortally wounded while defending his press. The State of Illinois has erected a monument to Lovejoy at Alton.

**Lovelace, Richard** (1618-1658), a Cavalier poet, born in Kent and educated at Gloucester Hall, Oxford, where he was "accounted the most amiable and beautiful person that ever eye beheld." He was twice imprisoned during the Revolution. While at Oxford he began writing. His comedy, *The Scholar,* performed there in 1636, and his tragedy, *The Soldier,* written in 1640, have been lost. While imprisoned, he arranged those poems appearing in 1649 as *Lucasta,* most celebrated of which are *Going to the Wars* and *To Althea from Prison.* Lovelace died in poverty. *Posthume Poems of Lovelace* appeared in 1659.

**Lover, Samuel** (1797-1868), an Irish artist and author, born in Dublin. His ballad, *Rory O'More,* early attracted attention, as also did his portrait of Paganini exhibited at the Royal Academy in 1833. He depicted Irish life with keen and farcical humor, and his plays and "Irish Evenings" (entertainments of stories, songs and recitations) proved highly popular in Canada, the United States and England. His works include *Legends and Stories of Ireland, Handy Andy, Treasure Trove* and *Songs and Ballads.*

**Low, *Lo,* Seth** (1850- ), an American educator and public man, born in Brooklyn, N. Y. He graduated from Columbia College in 1870, early became interested in public affairs, and in 1882 was elected mayor of Brooklyn, in which capacity he introduced radical reforms in all departments of city administration. In 1890 he became president of Columbia College, which was removed to its present campus during his administration, reorganized on a university basis and its name changed to Columbia University. He presented Columbia with a library building valued at $1,000,000. In 1899 he was a member of the United States delegation to the Peace Conference at The Hague. Two years later he was elected mayor of Greater New York on an independent ticket, and his administration was characterized by extensive reforms in the police and finance departments.

**Lo'well, Abbott Lawrence** (1856- ), an American educator, born in Boston. He graduated from Harvard in 1877, and from the Harvard Law School in 1880, practiced law in Boston for 17 years and then became a lecturer at Harvard. In 1899 he was made professor of science of government; and in 1909 became president of his alma mater, succeeding Charles William Eliot. Dr. Lowell succeeded his father in 1900 as financial head of the Lowell Institute of Boston. Among his works are *Essays on Government, Governments and Parties in Continental Europe* and *The Government of England.*

**Lowell, James Russell** (1819-1891), distinguished American poet, essayist, critic and diplomat, was born in Cambridge, Mass., February 22, on the 87th anniversary of the birth of George Washington. Elmwood, the house in which he was born, was a fine old Tory mansion, built some years before the Revolution, a square, three-storied dwelling sheltered by pines and English elms, with the winding River Charles to the right of it. Charles Lowell, the father of the poet, was a Congregational minister, a man of college training, whose natural claims to culture had been broadened by travel in Europe and contact with eminent men. Mr. Lowell married Harriet Traill Spence, an imaginative girl who had inherited a mystical strain that made her fond of repeating old ballads in the twilight. Lowell's natural fondness for books was stimulated by access to a fine library and contact with his poetry-loving mother, so that his home life tended in every way to foster a taste for literature. Moreover, in the beautiful woods and meadows about Elmwood where he was accustomed to spend hours in play, he learned to know and love

the birds and trees, gaining impressions that were later to beautify some of his best verse.

Student Days. At the private school where the boy was prepared for college he received an especially fine training in Latin, entering Harvard at the age of 15. While at college Lowell followed his bent for reading and gained some distinction among his classmates as a contributor to the college paper, but he tried the patience of the authorities severely by his indifference to formal regulations. In his senior year, as a result of his shortcomings, he was sent to Concord to pursue his studies with a private teacher, and was not allowed to rejoin his class until the Saturday before Commencement. Lowell took his exile cheerfully enough, wrote the class poem, which he had printed for distribution among his classmates after graduation, and made the acquaintance of Emerson. On leaving college, Lowell decided, not without some hesitation, to follow the profession of law, and was admitted to the bar in 1840, after a course at the Harvard Law School. His time, however, was not given up wholly to his law studies. He read constantly, enjoying especially the classic Latin authors and the Greek and early English dramatists.

Early Literary Ventures. About the time that he took his degree in law, Lowell became engaged to the sister of one of his classmates, Miss Maria White, a young woman whose influence on her poet-lover was to be considerable. Her superior qualities of mind, for she herself was a poet of no ordinary ability, and high faith in his powers meant everything to the young man, at that time distrustful of the plans and hopes for a literary career, which were beginning to shape themselves. What sympathy he had previously felt for the abolition cause became, through her influence, genuine devotion to the anti-slavery movement, and from the year 1840 his poems and letters were full of the question. This period marks, too, the beginning of that kindly feeling for humanity that



is so stamped on his writings. A volume of poems entitled *A Year's Life,* published in 1841, was the first evidence of a new stimulus in his life. This was followed by contributions in prose and verse to several magazines. Feeling more and more a distaste for law, he definitely abandoned it, and attempted, in 1843, to establish a literary journal in New York, *The Pioneer,* a venture that failed, but which made him all the more determined to devote his talents to literature. He now began to write regularly, publishing a collection of poems at the close of 1843, and the following year, his first critical prose studies, *Conversations on Some of the Old Poets.*

Period of Development. Shortly after his marriage in December, 1844, Lowell began work in Philadelphia as an editorial writer for the *Pennsylvania Freeman,* but the following May he returned to Elmwood, where, stimulated by the companionship of his wife, he found his literary powers gradually ripening. By the year 1848 he had written anti-slavery articles for the *London Daily News,* begun contributing to the *National Anti-Slavery Standard* of New York, and published a series of poems and his well-known long poems, *A Fable for Critics, Biglow Papers* (first series) and *The Vision of Sir Launfal.* This period of development, in which Lowell gained a wide reputation as a man of letters, was made sorrowful by the death of three of his children, and more than all by the death of his wife in 1853, following a trip to Europe. The prose volume, *Fireside Travels,* is a collection of travel sketches relating to this journey.

Professor at Harvard—Prose Period. In January of 1855 Lowell received notice of his appointment to succeed Longfellow in the Smith professorship of languages and literature at Harvard. After concluding a course of lectures in Boston and the West, he went to Europe for a year of travel and study, beginning his work at Harvard in September, 1856, and continuing it for 20 years. In 1857 he married Miss Frances

Dunlap, the governess of his little daughter Mabel. Lowell now entered upon a prose period, for, though he did produce some poetry, his work consisted chiefly of editorial and critical writing. He became the first editor of the *Atlantic Monthly,* founded in 1857, holding the important position until 1861, and from 1862 to 1872 was connected editorially with the *North American Review.* Perhaps the noblest work of this period was his *Commemoration Ode,* which he recited at the Harvard College memorial exercises held in honor of the Harvard students who had died during the war. This great ode expresses the best there was in the author. In 1868 appeared a collection of the poems written since 1848, entitled *Under the Willows,* and in 1870, *Among my Books,* a reprint of some of his literary essays. This was followed in 1871 by *My Study Windows,* another collection of literary essays. In 1872, accompanied by his wife, he made his third trip to Europe.

Later Years. On his return to Elmwood in 1874 Lowell began to take an active interest in political questions. In 1877 he was appointed ambassador to Spain, being transferred to the English court three years later. Lowell's striking success as a representative of his country was due partly to his executive ability and partly to his social, oratorical and literary gifts. His recall in 1885 was received by the English people with genuine regret, and Queen Victoria is recorded to have said that no other ambassador during her reign had created so much interest and been so highly esteemed as Mr. Lowell. The sudden death of his wife in 1885 was a sorrowful conclusion to this period of personal triumph.

After his return to America Lowell resumed his literary work, lecturing, writing and finding pleasure in the many friendships he had formed with men of letters both in America and abroad, for he made several trips to England during this closing period. One of his last tasks was the revision and preparation for the press of the collected edition of his works in poetry and prose, published in 1890 in ten volumes. He died at Elmwood on the 12th of August, 1891.

Literary Qualities. Lowell's personal letters, edited after his death by Charles Eliot Norton, express his interesting personality in a delightful way. They are pervaded with a genial humor that is sometimes sentimental, sometimes almost boyishly playful, and are suggestive of that quick sympathy for humanity and nature which is one of his strongest traits. In them, too, we find traces of a deeply affectionate Lowell who was unashamed of any frank expression of his love for his family and friends. His spontaneity, sincerity and enthusiasm kept him young in spirit through his long and varied career as a writer, professor and public man, and it is this freshness of spirit and vigor that keeps his work, scholar as he was, for the most part free from bookishness. The many-sided nature of this author is expressed in the variety and copiousness of his writings. He was superior in the field of literary criticism, a profound student of political questions, a poet of nature and a writer of humorous verse. He rose to heights of exaltation in his stately memorial odes, and wrote tenderly and simply of his grief over the death of his little daughter, in *The First Snowfall;* the same poet who produced that famous political satire, *Biglow Papers,* unsurpassed in American literature as an example of humorous, satiric verse. In view of his richly endowed mind and his many-sided intellect, Lowell is justly regarded as our representative man of letters, the highest type of American culture.

**Lowell, Mass.,** a city and one of the county seats of Middlesex Co., 26 m. n.w. of Boston, on the Merrimac River at the mouth of the Concord, and on the Boston & Maine, the New York, New Haven & Hartford and other railroads. The site of the city is uneven and picturesque. It has an area of about 14 sq. m. Interurban electric lines connect with all the near-by towns and cities. Lowell is noted for its large annual out-

put of manufactured articles. The falls of the Merrimac descend 32 ft. at this point, which, together with the power supplied by the Concord River, furnish immense motive power for manufacturing purposes. By means of a system of canals, water power is furnished to many Lowell factories, then returned to the Merrimac to be used lower down the river for the mills of Newburyport, Haverhill and Lawrence.

The city contains the Lowell Tuberculosis, Lowell General, Corporation and St. John's hospitals, St. Peter's and Theodore Edson orphanages, Ayer Home for young women, St. Patrick's Home and an old ladies' home. Among the educational institutions are a state normal school, Rogers Hall School and St. Patrick's Academy. The Lowell Textile School, opened in 1897, offers courses in cotton and wool manufacturing, textile engineering, chemistry and dyeing, and is rated as the leading institution of its kind in the world.

The prosperity of Lowell is mainly derived from the manufacture of cotton and woolen goods. The products of the textile mills include cotton sheetings, felts, shirtings, prints, drillings, carpets, serges, cassimeres, hosiery, shawls, beavers and elastic and knit goods. There are also extensive manufactories of machine-shop products, carriages, furniture, turbine wheels, hydraulic presses, bobbins and machinists' tools, patent medicine, boilers, paper, rubber heels, chemicals, boots and shoes, perfumery and cosmetics and automobile tires. The city has one of the largest bleacheries in the country.

Lowell has many points of scenic and historic interest, including the Ladd and Whitney Monument, Fort Hill Park, Pawtucket Falls, a city hall and public library of 100,000 volumes. James McNeill Whistler was born here in 1834 and in 1907 the house where he was born was purchased by the Art Association for an art museum. Lowell was named in honor of Francis Cabot Lowell, who had improved Cartwright's power loom, and who began here the manufacture of cotton goods. It received a city charter in 1836. Population in 1910, 106,294.

**Loyo'la, Saint Ignatius of** (1491-1556), the founder of the Society of Jesus, or Jesuits, was born in the Castle of Loyola, near Azpeitia, Spain. He chose the career of a soldier, and was severely wounded in 1521. This changed the course of Loyola's life. Upon his recovery he renounced the world and entered the Church. At the completion of his novitiate he went to Paris, where, for a number of years, he devoted himself to general and theological study. Here, in 1534, he induced Francis Xavier, Lainez and others to join him in forming the nucleus of the Society of Jesus. The final plans of the order were confirmed by Paul III in 1540. St. Ignatius governed the society he founded, from its inception until his death. See JESUITS.

**Loyson,** *Lwah" zong',* **Charles,** better known by his monastic name, **Père Hyacinthe** (1827-1912), a noted French preacher, born at Orléans. He received his education at Pau and the Theological Seminary of St. Sulpice in Paris. Ordained as priest in 1851, he served for ten years as professor in seminaries at Avignon and Nantes, entered the convent of the Carmelites in Lyons, and joined that order in 1863. His preaching at once attracted attention for its eloquence and aroused intense enthusiasm, and in 1865 he was called to the Notre Dame in Paris. For his boldness in criticizing what seemed to him abuses in the Church, he was expelled from the order. When the Vatican Council in 1870 declared in favor of papal infallibility, Père Hyacinthe united in the protest and joined the Old Catholic movement. He founded the Gallican Church in Paris in 1879 and served as its rector for a number of years, later preaching in Old Catholic and Protestant churches in Switzerland.

**Lub'bock, Sir John** (1834-1913), a British scientist and statesman born in London. He studied at Eton and entered the banking business with his father, continuing in this line for many years

and holding many positions of trust and honor both in the commercial world and in the State. He was also officially connected with educational affairs. He was elected to Parliament in 1858, where he served at intervals for 42 years. In 1900 he was made the first Baron of Avebury. In addition to his work in the financial and educational world, Sir John accomplished much in the fields of archæology and anthropology, and wrote books on insect life and botany. His books on scientific subjects were so written as to appeal to the ordinary reader, and did much to popularize science.

**Lü'beck,** one of the three city states of the German Empire, consisting of the free city of Lübeck, the territory between Prussia, the Baltic Sea, Mecklenburg and Oldenburg, and nine tracts of territory in Holstein, Mecklenburg-Strelitz, Oldenburg and Lauenburg. Its area is 115 sq. m. The commerce of Lübeck, chiefly with Denmark, Sweden and Russia, is more important than its manufactures, which consist mainly of the production of machinery, ironware, chemicals, spirits and preserves. In 1875 a democratic constitution was adopted, and the government of the city does not differ materially from that of Hamburg. It was founded by Count Adolphus III of Holstein in 1143, and was declared a free imperial city by Frederick II in 1226.

**Lu'cas, Edward Verrall** (1868- ), an English author. Early in his literary career he was connected with the London *Globe* and with the London *Academy*. The charm of his writings, which consist mainly of descriptive sketches and stories, is due chiefly to the grace and lucidity of his style and his quaint humor. His publications include *A Wanderer in Holland, A Wanderer in London, Anne's Terrible Good-Nature, Over Bemerton's, The Slowcoach, Old Lamps for New* and *London Lavender*. He also edited the *Works and Letters of Charles and Mary Lamb*.

**Lucern,** *Lu sern'*. See ALFALFA.

**Lucerne,** *Lu surn,'* a city of Switzerland, the capital of a canton of the same name, situated near the shores of Lake Lucerne. The surrounding range of imposing mountains makes its site one of the most picturesque in the world. The older part of the city is medieval in its architecture, and there are several statues and works of art of great beauty. The public buildings are impressive, and one of the finest among these is the International Museum of War and Peace, dedicated in 1902. Lucerne was a town in the 11th century; it belonged to the House of Hapsburg until 1332, at which time it entered the Federation.

**Lucerne, Lake of,** a lake of Switzerland, one of the most beautiful in Europe. It is situated in the north-central part of the country and is bordered by the cantons of Lucerne, Schwyz, Uri and Unterwalden. Its shape is that of an irregular cross. It is about 23 m. in length, from 1½ to 2 m. in width, has a maximum depth of 702 ft. and is 1434 ft. above sea level. The surrounding country is beautiful, the gloomy peak of Mt. Pilatus standing on one shore and opposite it the sunlit, garden-covered Mt. Rigi, commanding an unsurpassed view. The different basins of the crosslike body are the Bay of Lucerne, the Alpnach and Küssnacht bays, the Lake of Uri, the Buochser See and the Weggiser See. The Axenstrasse, known as one of the most beautiful roads in existence, and a remarkable engineering feat, winds along the eastern shore. The lake is a favorite resort for tourists. See TELL, WILLIAM.

**Lucian,** *Lu' shan,* (about 120-about 200), a Greek writer, born at Samosata, in Syria. He was first apprenticed to his uncle, a sculptor, but ran away after being cudgeled for ruining a fine marble slab, and, as a result of the influence of his mother, was enabled to turn to literature through his early study of rhetoric. Known first as a lecturer and declaimer, he afterwards wrote essays and dialogues which caused him to be ranked with the great prose writers of the world. His satire was keen and brilliant. Among his works are *Herodotus, Dialogues of the Gods, Dialogues of the Dead* and *Dialogues of Courtesans.*

**Lucifer,** *Lu' si fer,* (Greek, Phosphorus), the ancient name for Venus, appearing as the morning star. The same planet, as the evening star, was called Hesperus. Both were represented as a handsome youth with torch of flame.

**Luck'now,** a city of British India, capital of Oudh, situated on the Gumti River, 675 m. by rail n.w. of Calcutta. At a distance the city is picturesque with its many domes, pinnacles and minarets, but the streets are narrow and dirty and the buildings mean and sordid. The public edifices include the palaces, the great mosque, the Canning College, a museum, a college for half-caste children, several European missions and churches and the Imambara, one of the largest rooms in the world. The trade in grain, timber, iron and raw cotton is large, and the leading industries include railway workshops and the manufacture of muslins, gold and silver brocade, shawls, velvet and lace. Lucknow is one of the oldest cities of India. It was the scene of the Sepoy Mutiny in 1857, and the memorable defense of Lucknow is noteworthy. Population in 1901, 264,049.

**Lucretia,** *Lu kre' shi a,* a famous heroine of Roman story, wife of L. Tarquinius Collatinus. While the Roman army was besieging Ardea, she was outraged by Sextus, son of Tarquin the Proud, King of Rome. When he had left her, she vowed her husband and father to her revenge and stabbed herself. The facts being known, the people rose against the Tarquins, whom they expelled from Rome, and the republic was established. See BRUTUS, LUCIUS JUNIUS.

**Lucre'tius** (Titus Lucretius Carus) (about 99-55 B. C.), a Roman poet. Little is known of the details of his life, but through his great poem, *De Rerum Natura,* he unconsciously reveals himself as one of the noblest minds in history, through his earnest seeking for the truth. His work is psychological, and his philosophy is an exalted type of Epicureanism that shuns sheer seeking of pleasure and accepts rather fortitude and renunciation as a guide to conduct. In places his work is rugged and without polish, but as a whole his appreciation of beauty and poetry is of the highest order.

**Lud'ington, Mich.,** a city and the county seat of Mason Co., about 85 m. n.w. of Grand Rapids and the same distance n.e. of Milwaukee, Wis., on Lake Michigan at the mouth of the Marquette River and on the Pere Marquette Railway. It has steamboat connection with Chicago, Milwaukee and other lake ports and direct freight connection by railroad ferry with Kewanee, Two Rivers and Manitowoc on the other side of the lake. The city has a large trade in grain, salt, lumber and manufactured products, including watchcases, game boards and printers' supplies. Settled in 1859, the place was incorporated in 1867 and chartered as a city in 1874. It was first named for Pere Marquette, who died and was buried on the site (afterwards removed to Point St. Ignace); but it was renamed in 1871 in honor of James Ludington, a local lumberman.

Epworth Heights adjoining Ludington is noted as a summer resort and for its annual Chautauqua assembly. Population in 1910, 9132.

**Lud'low, William** (1843-1901), an American soldier, born on Long Island, N. Y., and educated at West Point. As an engineer he served creditably with Sherman in the South during the Civil War. Subsequently, from 1872 to 1876, he was chief engineer for the Black Hills and Yellowstone Expedition, and during the Spanish-American War he distinguished himself at El Caney and in the attack on Santiago. In December, 1898, he became the first American military and civil governor of Havana, being relieved in May, 1900. In January, 1900, he was promoted to be brigadier-general in the regular army.

**Lug'worm",** or **Lobworm,** a family of long, marine Annelids, or worms, found burrowing in the wet sand along the beaches of Europe and North America. The lugworm has neither eyes nor tentacles and only small, feeble feet. The head is rounded and armed with a stout proboscis. The lugworm is nearly a foot long. It is used for bait.

**Luke, Saint,** the author of the *Gospel of St. Luke* (See Gospels, The) and of the *Acts of the Apostles,* described under its title. Eusebius and Jerome record him to have been a native of Antioch, but this cannot be determined absolutely. He was a physician and evidently a man of liberal education and was for years a close friend and companion of Paul. His Gospel and *Acts of the Apostles* possess much literary excellence.

**Lumba'go,** a sort of rheumatism affecting the muscles of the loins. The disease attacks suddenly, usually after exposure to cold, and sometimes quite disables the patient. The pain is often severe, ordinarily sharp and intermittent, like cramp, but may take the form of a dull, steady ache; and it may last a few hours or be protracted several weeks. One attack predisposes to others. Massage of the affected muscles should be a part of the treatment; keeping the patient warm is also important.

**Lumber.** In the United States the term *lumber* is applied to timber that has been sawed or split into boards, planks, joists, lath and a variety of other shapes. The term *timber* is used to designate the trees before they are made into lumber. In England, however, the term *timber* includes both the trees and the lumber made from it. Lumbering is the industry of cutting trees and preparing them for market. The chief lumber-producing countries of the world are the United States and Canada in North America; Russia, Sweden, Germany and France, in Europe; India and China in Asia; the Congo State in Africa; and the various states of the Commonwealth of Australia. The leading states in the United States are Washington, Louisiana, Wisconsin, Michigan, Pennsylvania, Arkansas, Minnesota, Texas, Georgia, Alabama, California and Oregon. According to the census of 1910, there were in the United States, in 1909, 40,671 establishments engaged in the manufacture of lumber and timber products. These establishments had a total capital of $1,176,675,000, gave employment to over 736,000 men, and manufactured products were valued at $1,156,129,000. Lumbering is the third industry in importance in the country.

Lumbering. Lumbering is one of the oldest as well as one of the most universal of occupations. Since man began to make tools and weapons and to erect dwellings, he has made use of wood, and in every country where timber grows it is used by the inhabitants. While the lumber of the United States and European countries consists chiefly of pine, fur, spruce, hemlock and the various hard woods, that of China and Japan consists chiefly of bamboo, that of the countries of southern Asia contains much teak and that of Australia is principally eucalyptus.

Lumbering includes felling the trees, cutting them into logs, hauling the logs to mills, sawing them into the desired forms, such as boards, planks and joist, and placing these forms on the market. The methods by which these various steps are accomplished vary widely in different parts of the world and in the different parts of our own country. In China and Japan, for instance, all the work is done by men; in India and Siam elephants are employed for moving heavy timbers, and they display remarkable skill in carrying and piling the lumber.

*Logging.* In the white-pine regions of Canada and the United States, most of the logging is done in the winter. Camps are located in the forest where the trees are to be felled. The camp usually consists of several low log buildings, one being used for the kitchen and mess room, another for lodging the men, another for stores and others for stables. The men in each camp are organized into crews, each crew doing a special line of work and being under the immediate direction of a foreman. One crew fells the trees, another cuts them into logs, another makes and keeps in repair the roads over which the logs are hauled to the skidding place, and so on. A general foreman or superintendent directs the work of all the crews. The trees are first notched on each side by choppers, and

# WHERE OUR WOOD COMES FROM

The great trees of the forests are cut down and sawed into logs.

The logs are dragged away and piled upon sleds.

This is a rather heavy load for two horses to pull.

# GETTING THE LOGS TO THE CITY

A train-load of felled trees on the first stage of its journey.

The logs are floated in the nearest stream down to the sawmill.

In the sawmill they are made into plank, lath, shingles, beams and other forms for the carpenter and the furniture maker.

LUMBER

the felling is completed by sawyers. The logs are hauled to the point from which they are to be taken to the mills, on sleds, usually drawn by four horses. The roads are graded so as to make them as nearly level as possible, and large loads are common. The logs are taken to the mills by floating them down streams or by railways. Formerly all transportation was by river, but when the forests near the streams had been cut away, it was found to be more economical to build railways into the forests than to haul the logs long distances to reach the streams. Considerable log driving, however, is still done on the Mississippi and the rivers of Canada. When the logs are hauled to the mill by train, they are usually loaded on the cars by hoisting engines.

In the yellow-pine and cypress forests of the Southern States, lumbering is carried on throughout the year, and nearly the same methods are employed as in the white-pine regions, except that the camps are not so common. In Washington, Oregon and the northern part of California the trees are so large as to make special machinery necessary for handling the logs. Platforms are erected for the choppers of the largest trees so that they can cut the trees above the swelling of the trunk near the ground, and stumps 10 and 15 ft. high are not uncommon in the deforested regions in these states. A single log often constitutes a load for one car. All movements of the logs are by steam power.

*Sawing.* Sawmills are usually located on streams, down which the logs are floated, or in the forests near where the timber is cut. When the logs arrive at the mill, they are usually pulled up an inclined plane by an endless chain running on sprocket wheels and containing hooks which are driven into the logs. The logs are afterwards rolled one at a time with cant hooks by men and placed on a staging, and finally set upon the headblocks of the sawmill.

In order to facilitate the rapid handling of logs, a device known as a "nigger" is employed to turn the log over, so that it will rest solidly on the headblocks. This nigger consists simply of an arm projecting from an upright beam and operated below the floor of the building, generally from the rod of a vertical steam piston, so that considerable force in an upward direction may be exerted in turning the log over. After the log is placed properly on the headblocks, it is held securely in place by hooks, called dogs. The headblocks are bolted to the carriage, and this is made to carry the log to the saw. In large establishments, this is done usually by means of a steam feed, which consists of a long iron tube forming a cylinder with a piston fitted in it, having a piston rod equal to the length of the log. By the action of steam on the piston, the log is forced quickly up to the saw, which cuts through it, making a plank. By a system of gearing and friction pulleys, the carriage is made to return to its former place at a higher rate of speed than it was pushed forward. The sawyer or his assistants adjust the headblocks by screwing them up to the required distance to cut the next plank or to square the log. Band saws are now most generally employed in large lumber mills, having largely displaced both the circular and the gang saw, particularly in sawing boards. Elevators and conveyors are arranged to carry away all the sawdust and blocks, usually to a large furnace known as a refuse burner, where they are burned.

For conveying the boards and planks away as they are cut, various automatic devices are employed, those for boards consisting of a trimmer. This is simply a frame having four endless chains with lugs moving over it, forming a sort of elevator which hoists the boards up and against two circular crosscut saws, which, being spaced 16 ft. apart, cut the boards just that length. The refuse ends fall into a conveyor, while the boards are conveyed on moving rollers to be stacked or otherwise distributed.

*Dry Kilns.* When it is desired to maintain a continuous supply of lumber, dry kilns are employed, and they constitute an important feature of the modern sawmill plant, particularly in the yellow-

pine districts of the South. Unless yellow-pine boards freshly sawed are dried either in steam-heated dry kilns or smoked by fires, they become spotted after a few days' exposure to the air. Dry kilns for yellow pine usually consist of tunnels about 75 ft. long, 10 ft. high and 17 ft. wide, for the accommodation of the planks and boards, the standard length of which is 16 ft. They are piled crosswise on trucks with a piling strip one inch thick separating each board, for the purpose of letting the heated air pass between them so as to hasten drying. The trucks run on rails.

Steam dry kilns are of two types. In one of these a large fan is used to exhaust the air, which is heated to about 160° F., from around the coils, and to force it through the kilns into and around the piles of lumber. The other simply has coils of pipe laid under the lumber. In the former plan, ventilation is provided for and maintained by the force of the air, through suitable outlets generally in the floor of the dry kiln, while in the latter plan, tall wooden chimneys or ventilating stacks draw out the moisture produced by evaporation. Sawmills cutting 100,000 ft. of one-inch yellow-pine boards per day require at least 12 standard-size kilns with large platforms for loading and unloading.

PRESERVATION. Of the different methods of preserving lumber from decay, the simplest is that of subjecting the materials to steam at high pressure, say 200 to 250 lb. per square inch, in a closed receptacle. Various chemical and patented processes under different names have also been employed, but the creosoting process (See CREOSOTE) is the most valuable, for the reason that it not only arrests decay in wood generally, but under water as well, and also prevents the worm called the teredo (See TEREDO) from destroying the timber of wharves. Localities on the South Atlantic seaboard and on the coast of the Gulf of Mexico are subject to serious depredations from this worm. The creosote is forced by great pressure into the wood, while it is enclosed in a hermetically sealed tank, which holds about a carload of lumber. See FORESTRY.

**Lump'y Jaw,** or **Wooden Tongue,** a disease common among cattle and occasionally afflicting man. It is supposed to come about through the eating or handling of grasses or grains which are affected by a certain fungus or through eating raw meat. The jaw or other parts of the mouth are usually affected, although it is known to attack other parts of the body, notably the intestines and the bones. The disease develops slowly and causes a formation of tumorlike tissue, which may be treated with applications of potassium iodide or cut out. Cattle suffering from lumpy jaw seldom recover without assistance. Veterinarians call the disease actinomycosis.

**Lu'nacy.** See INSANITY.

**Lu'nar Caustic,** *Kaus' tik,* a preparation of silver nitrate obtained by dissolving silver in nitric acid and used by physicians and surgeons in cauterizing wounds. For surgical work it is put up in sticks, or pencils, which are gray-white when fresh but blacken upon exposure to the air. It leaves a dark stain upon the skin or upon any organic matter, and for this reason is employed in the manufacture of copying inks. Its value in surgery consists in its power to burn away diseased tissue and so render a wound antiseptic.

**Lun'dy, Benjamin** (1789-1839), an American abolitionist of Quaker ancestry, born in Hardwick, N. J. In early manhood he moved to Ohio, where he organized "The Union Humane Society" to fight slavery, and wrote anti-slavery articles for the papers. He founded at Mt. Pleasant, in 1821, the *Genius of Universal Emancipation,* the first anti-slavery journal in America. The paper was moved to Baltimore in 1824, and later to Washington, where, after a few years, it failed. In 1836 he started the *National Inquirer* in Philadelphia, but retired from it two years later. In 1838 Lundy's property was destroyed by a mob, and he removed to Lowell, Ill., with the intention of renewing the publication of the *Genius of Universal Emancipa-*

*tion,* but his plans were frustrated by death.

**Lundy's Lane, Battle of,** one of the most obstinate engagements of the War of 1812, fought July 25, 1814, at Lundy's Lane, near Niagara Falls, on the Canadian shore. The Americans were first commanded by General Scott and then by Gen. Jacob Brown, General Riall leading a much superior number of British. As aggressors, the Americans seemed to gain the advantage in the early part of the struggle, and captured a battery with which the enemy swept all parts of the field. But at midnight, after a six-hours' fight, the result was a tie; for the Americans were too exhausted to follow the British when they withdrew. Brown and Scott were severely wounded.

**Lungs,** the pair of spongy, respiratory organs lying within the chest cavity and enfolding the heart and its connecting blood vessels in the hollow formed by the depression on the side of each toward the middle line of the body. Together they form a pyramidal mass, conforming to the shape imparted by the ribs to the chest cavity, and coextensive with that chamber. They are united at the top by the trachea, or windpipe, which extends downward through the middle line of the body half the length of the chest cavity, where it separates into two branches, the right and the left bronchus. Each of the bronchi separates into two branches. These are the bronchial tubes. They enter the lung, and after innumerable branchings, like the twigs of a tree, pursue their way to the surface of the lung and terminate in circular, cuplike depressions called alveoli. These alveoli, or air sacs, are arranged in groups called lobules. The aggregations of lobules, with their accompanying tissues, constitute the lobes. The smaller left lung is divided into two, the right into three lobes.

The air sacs are an essential part of the respiratory process, filling with air at each inspiration and transferring their oxygen to the multitude of tiny capillaries embedded in their membranous walls, and taking the waste material thrown off by those vessels and forcing it out of the body with the air expelled. Thus the lung exercises through them an important function, both as a nutritive and as an excretory organ. The walls of the air cells are supplied with elastic tissue, which enables the lungs to expand in response to the muscles which control them and to collapse when those muscles recoil, thus expelling the poisonous air. It is estimated that if the walls of the air cells could be flattened and placed side by side, they would cover an area of 2600 sq. ft.

Surrounding the bronchial tubes and air cells is a mass of other lung substance composed of nerves, blood and lymphatic vessels and tissues, and the whole is enclosed in a membranous bag called the pleura, which prevents friction with the walls of the chest. The disease called pleurisy is inflammation of the pleura. See RESPIRATION; CIRCULATION.

**Lu'pine,** a name given to a genus of wild and cultivated plants of the Pulse, or Pea, Family. They are generally herbs or shrubs with erect stems bearing leaves composed of three little rounding leaflets. The flowers hang on slender stems and are butterfly-shaped. The wild species grow as weeds in the Middle and Atlantic states and bear blue or pinkish flowers in the late spring. Those cultivated for ornaments are hardier shrubs grown chiefly in the West or in gardens in Europe. The fruit is a long pod and is the *pulse* spoken of in the Bible.

**Luray' Cavern,** a series of caves in Page County (near Luray), Va. The cavern consists of hundreds of stalactite chambers, many of which have never been explored. It is much smaller than Mammoth Cave in Kentucky, underlying as it does only about 100 acres, but it is celebrated for its remarkable formations, some of which resemble suspended draperies.

**Lute,** a musical instrument of ancient origin. The body of the instrument is in the shape of a half pear. The convex surface is ribbed like a melon, from stem

to tip; across its flat surface are stretched five or six pairs of strings, as on the violin, each pair tuned in unison or in octaves. The strings are plucked by the right hand, and the left hand shortens or lengthens the vibrating portion by pressure upon the frets, thus regulating the pitch. The lute is no longer in use. See VIOLIN.

**Lu'ther, Martin** (1483-1546), the leader of the Protestant Reformation in Germany, born in Eisleben, Saxony. At 14 Luther entered the seminary at Magdeburg, where he often went supperless to bed. He had the same hardships the next year at Eisenach, until one day, while singing in the street for his daily bread, his clear voice attracted the attention of Ursula Cotta, who received him into her home. When he went to the University of Erfurt in 1501, he intended to enter the profession of law; but he was uneasy, and gradually the monastic life seemed to him the only means of saving his soul. The discovery in the university library of a copy of the Vulgate translation of the Bible had much to do with this decision. After two near escapes from death he suddenly announced that he had made up his mind to become a monk, and he sought the Order of St. Augustine in 1505, after taking his master's degree at the university.

Luther became a priest in 1507 and the next year was recommended to Frederick the Wise of Saxony as a professor for his recently founded University of Wittenberg. Receiving an appointment to the chair of philosophy in that institution, his teachings soon began to attract attention. In 1511 he made a journey to Rome. During these years his fundamental doctrine of justification by faith was slowly developing in his mind. He was aroused when in 1517 the monk Tetzel came to preach in the neighborhood, bringing indulgences recently granted by Pope Leo X. Luther then nailed 95 theses in Latin to the church door at Wittenberg, and was soon surprised to learn that these theses had been translated into different languages and were being discussed all over Europe. The Reformation had begun. Pope Leo summoned Luther to Rome, but he declined to go, and a meeting was finally held at Augsburg in 1518 with Cajetan, the papal legate. Luther refused to recant. In 1519 he engaged in a public disputation at Leipsic with the celebrated Dr. Eck, and realized as never before how wide was his separation from the Roman Church.

This debate marks the final rupture of Luther with the papal authority. He now published his three famous treatises: *An Address to the Nobility of the German Nation*; *On the Liberty of a Christian Man*; and *The Babylonian Captivity of the Church.* These appealed to national patriotism and attacked the privileges of the Church and the priesthood. They drew a large following of enthusiastic young patriots, and, unfortunately, men of violence. A papal bull condemned Luther, but he burned it openly in Wittenberg in 1520, together with books declaring papal supremacy. Charles V summoned Luther to the Diet at Worms, which met in April, 1521. Luther boldly went and firmly refused to recant, unless he was proved wrong by the Scriptures. While returning from the Diet he was taken by emissaries of Frederick the Wise to Wartburg Castle, where he completed his translation of the New Testament into German. In March, 1522, he was back in Wittenberg, preaching and publishing with his accustomed energy.

The parties that had rallied around Luther against the authority of the Church now broke out into revolt against society and the State. The uprising of the knights under Franz von Sickingen was soon put down and the incompetent leader was killed. The Peasants' War (1524-1525) was a much more serious affair. The poor listened eagerly as Luther declared the equality of men before God, and as he scored the nobles for their injustice. They drew conclusions that Luther never intended, and, aroused by their excesses, he gave way to some of the most violent language that he had ever used. However, Luther later cen-

sured the princes severely for their cruelty and brutality in putting down the revolt. He felt the sufferings of the poor, but he would not be drawn from his religious reforms by the social and political questions that were already beginning to attract the people of Europe. He was impatient of anything that interfered with his religious work, and by his hymns, schools, catechisms and translations of the Bible he deepened the religious and educational side of the Reformation and established its principles permanently among the people.

In his later years he was led into controversy with Henry VIII of England and with the more placid Erasmus. He also broke with his old friend, Carlstadt, and with Zwingli over the doctrine of the Lord's Supper. He was in ill health, but continued his labors as author and organizer. In 1546 death came upon him at Eisleben, as he was on a journey to reconcile members of the Mansfeld family.

Luther possessed keen insight and a practical nature which kept him committed to the main issues. The violence and lack of self-restraint which he sometimes showed in his writings were the natural failings of a courageous, enthusiastic, whole-hearted, determined man. He was deeply religious and responsive to beauty in all of its forms. Seeking for immediate access to God, he found this in his fundamental doctrine of justification by faith, which has become the cardinal tenet of Protestantism.

**Lu'therans,** the members of those churches which accept the doctrine and polity formulated by Luther and his associates. The name Lutheran was first applied in derision by the opponents of the Protestants, and was not acceptable to Luther, whose original purpose was to secure certain reforms in the Church, not to start a new organization. At the present time nearly all the Protestants of Germany are Lutherans; the established churches of Denmark, Sweden and Norway are Lutheran in theology; the Finns and about one-fourth of the Swiss are of this faith; and Lutheran congregations are found in various other parts of the world. In 1530 the Augsburg Confession was presented by the Protestant theologians as the statement of their doctrine, and the Lutheran churches today recognize this Confession as the universal symbol of Lutheranism. The Lutherans emphasize the authority of the Scriptures, which they regard as having more weight than reason, tradition or Church decisions. Justification by faith is the central doctrine of their system. There are in the United States about 2,245,000 communicants.

**Luxemburg,** *Luk' sem burg,* an independent grand duchy of Europe, bounded on the n. and e. by the Prussian Rhine Province, on the s. by German Lorraine and France, and on the w. by Belgium. It has an area of 998 sq. m. and a population (1910) of 259,891. Luxemburg, the chief town, is the capital. The country is rich in iron ore, and contains iron furnaces, tanneries, weaving and glove-making factories, paper mills, breweries and sugar refineries. The government is in the hands of the grand duke, who sanctions and promulgates the laws. There is a council of 15 members and a chamber of deputies of 53 members. The Grand Duchy of Luxemburg was included from 1815 to 1866 in the dissolved Germanic Confederation. By the Treaty of London, 1867, it was declared neutral territory, and its independence and integrity guaranteed.

**Lux'or, The Temple of,** a great temple built near the site of ancient Thebes by Amenophis III about the year 1500 B. C. It is of sandstone and probably occupies the site of a much older temple. The temple consists of two courts, each surrounded by two rows of columns and connected by a long colonnade. Beyond these are a large hall and three sacred chambers, whose decorations are numerous and interesting. Three of the six colossal statues of Rameses II, carved from single stones of black granite, still stand before the temple. The inclosure, which is nearly 500 ft. long and 180 ft. wide, was connected with the temple at Karnak, over a

mile north of it, by an avenue bordered on either side with ram-headed sphinxes. Until excavations were begun by Maspero in 1883, the entire temple was buried in sand and rubbish. Among the most important relics are two well-preserved granite obelisks which stood before the gateway of the temple; one of these is now in the Place de la Concorde in Paris. See KARNAK, THE TEMPLE OF.

**Lycurgus,** *Li kur' gis,* a traditional lawgiver of Sparta, said to have lived about 900 B. C. He was the guardian of his nephew Charilaus, who became king in his infancy. When freed from his duties as guardian he is said to have traveled extensively in the East to study the laws and customs of other people. On his return he wrote a constitution for Sparta which was practically unchanged as long as she remained independent (See SPARTA). The main principle of this constitution was that all personal claims or interests should be subservient to those of the State.

**Lyd'ia,** an ancient country in the west-central part of Asia Minor. The Lydians came into the country about 720 B. C. In 546 B. C. the Lydian ruler, Crœsus, was defeated by Cyrus, and Lydia remained a part of the Persian Empire until the conquest of Alexander, 333 B. C. The Lydians early developed an interior commerce, and are said to have been the first people who coined money. They early came into relation with the Greeks through the Ionian cities. In the time of Crœsus these cities were a part of the Lydian Kingdom.

**Ly'ell, Sir Charles** (1797-1875), an English geologist, born at Kinnordy, Scotland, and educated at Oxford. He abandoned the study of law to devote his time and fortune to geological research, in pursuit of which he visited the United States and Europe. Generally credited with being the founder of modern geological science, Lyell wrote *Principles of Geology,* later amplified in *Elements of Geology* and *The Antiquity of Man.* In this last work he asserted that the human race was much older than was currently believed.

**Lymph,** *Limf,* a colorless, watery-looking fluid which nourishes the tissues of the body. The digested food material of the small intestine is absorbed by the lacteals and discharged into an elongated pouch called the *receptaculum chyli,* from which it passes into the thoracic duct and thence into the left subclavian vein. In the blood vessels this liquid is known as plasma (See BLOOD). The thin walls of the capillaries allow the plasma to filter through and irrigate the spaces between the cells of the tissues, supplying them with nourishment. The lymph is then drained off through a system of tubes carrying the waste material thrown off by the cells, and returned to the blood to be renewed. See LACTEALS; LYMPHATICS.

**Lymphatics,** *Lim fat' iks,* the system of tubes which collect the lymph from the tissues and return it to the blood, and which also absorb the food materials from the intestines and carry them to the blood. The minute tubes lying close to the blood vessels, which gather the lymph from the tissues, are called lymph capillaries. Those of the left side of the body empty their lymph into the thoracic duct, which conveys it to the left subclavian vein; those of the right side discharge their contents into a smaller duct entering the right subclavian vein. The lymphatics of the intestine are called lacteals. They receive the nutrient substances from the intestines and empty them into the *receptaculum chyli,* from which the contents are discharged into the thoracic duct. Throughout the course of the lymphatic vessels are numerous glands, which are abundant in the armpit, under the knee, in the groin, abdomen, thorax and neck. The contents of the lymphatics flow slowly, but are prevented from moving backward by a succession of valves, arranged so close together as to give the tubes a beaded appearance.

**Lynch'burg, Va.,** a city of Campbell Co., in the central part of the state, situated upon the James River and the James River Canal and on the Chesapeake & Ohio, the Norfolk & Western,

the Southern and other railroads. It is 124 m. s.w. of Richmond, in the midst of a beautiful hilly country that at the north is overlooked by the peaks of the Blue Ridge Mountains. Set in the midst of its rounding hills, the city of Lynchburg lacks the monotony of a wholly level situation. The broad streets ascend rolling hills or descend by steep slopes to the river. The private grounds are frequently terraced and are outlined by hedges, shrubs and trees of luxuriant foliage. The park system is extensive, and the areas reserved, though of great natural beauty, have been enhanced by fountains, statuary, well-kept shrubbery and flowers and shaded walks. The business blocks, apartment houses and factories are modern in their appointments, and the residences are especially attractive, being chiefly of the broad Southern style. Among the important public buildings are the new Auditorium, with a fine convention hall, Chamber of Commerce Building, a large Y. M. C. A. Building, a library, several hospitals and many fine churches. An excellent electric-railway system operates throughout the city and leads to suburban points.

The public school system of Lynchburg is housed in commodious and attractive buildings that are provided with laboratories, gymnasiums and large playgrounds. Further, the city is the seat of Virginian Christian College, the Virginian Collegiate and Industrial School for negroes and the celebrated Randolph-Macon Woman's College. Furnished with good water power from the James River, Lynchburg is an important manufacturing city. The boot and shoe industry leads, though established as recently as 1900. Tobacco of excellent quality is grown in the neighborhood, and this becomes the second export in value. Among the other products manufactured in the city are buggies, wagons, notions, hosiery, overalls, shirts, plows and adding machines. The textile mills, woodworking establishments, stone quarries and mines add to the city's commercial importance. The city owns and operates the waterworks.

Lynchburg was settled in 1757 by John Lynch, who owned and settled much of the surrounding land and established a ferry across the river at this point. It became a village in 1786, a town in 1805 and a city in 1852. It was a distributing center for Confederate supplies during the Civil War. It has had a rapid growth since 1900. Population in 1910, 29,494.

**Lynch Law,** a term derived from the name of Charles Lynch, a patriotic Virginian who, during the Revolutionary period, punished lawless persons in a summary manner, as courts of justice were rare and acts of outlawry not uncommon. Such a course seemed wise in order to protect peaceable citizens in the enjoyment of their rights and privileges. Lynch law is now applied to the capture and killing of self-confessed criminals, or those against whom proof is conclusive, without application to courts of justice.

**Lynn, Mass.,** a city and seaport of Essex Co., 10 m. n.e. of Boston and 5 m. s.e. of Salem, on Massachusetts Bay, 2 m. from the Peninsula of Nahant, and on the Boston & Maine, the Boston, Revere Beach & Lynn and other railroads. Electric suburban lines connect with many near-by towns and cities. The sections of the city are known as East Lynn, West Lynn, Glenmere and Wyoma. The business part of the city is built near the shore on low ground and the residential parts on higher levels. The three-mile shore-line adds to its attractiveness. The scenery is varied and picturesque. The city contains many handsome residences, especially on the shore side. Lynn Woods, a beautiful park, covers more than 2000 acres and is one of the largest pleasure grounds in the country.

Among the principal buildings are the Lynn Hospital, a home for aged women, a public library, a handsome city hall and a soldiers' monument. Lynn is primarily a manufacturing city and is noted for its extensive manufactures of women's and children's shoes. The manufacture of morocco-tanned leather and of electrical appliances are important industries. There are also manufactories of

cut leather, shoe machinery, patent medicines, car equipments, dynamos and shoe findings. The first smelting works in New England were established here in 1643 and the manufacture of boots and shoes was introduced in 1636.

Lynn was settled in 1629 and was called Saugus. The present name was adopted in 1637 in honor of Rev. William Whiting, whose former home was in Lynn Regis, Norfolk, England, and who was pastor at Lynn from 1636 until his death. Lynn received a city charter in 1850. Population in 1910, 89,336.

**Lynx,** or **Catamount,** a wild and fierce member of the Cat Family, living generally in cold Northern woods in Scandinavia, Russia, Canada and Alaska. In build the lynx is short, with a thick body, long, strong limbs and a short, tufted tail. Its eyes are fierce and said to be very sharp; its ears are pointed and erect. The coat is spotted or clouded and varies from light gray to dark blue-gray or brown. The lynx shows great patience and cunning in hunting and its attack is always made by a spring from ambush, so well calculated that the animal generally alights upon the back of its prey just where its claws and powerful jaws can produce speedy death; if it misses its prey it makes no attempt to pursue but lies in wait for the next. The lynx can go for days without food and endure cold and hardships better than the majority of animals. The Canadian lynx rarely ventures south of the Lake Superior region, but a smaller, more spotted species, called the bobcat, is found as far south as Mexico. Both the bobcat and the lynx, pursued by trappers for their pelts and by pioneers who must keep them driven back from the border line of civilization, are becoming more rare and are seldom seen save in their wild haunts.

**Ly'on, Mary Mason** (1797-1849), an American educator, founder of Mt. Holyoke Female Seminary, born on a farm near Buckland, Mass., and educated at Sanderson Academy and Byfield Academy. She was one of the founders of a seminary for girls at Ipswich, but in 1834 resigned her position to found Mt. Holyoke Female Seminary at South Hadley, Mass., in which girls of moderate means might find opportunities for a thorough education. The institution was opened in 1837, and at the time of her death she had served nearly 12 years as its principal. Under her wise management the school had attained a high standard and a national reputation; and the influence of her life and her ideals has in a large degree determined the character of higher education for women in America. She wrote *The Missionary Offering* and an account of the seminary.

**Lyon, Nathaniel** (1818-1861), an American soldier, born in Ashford, Conn., and educated at West Point. He distinguished himself in the war in Florida and against Mexico, in 1851 became captain and at the outbreak of the Civil War commanded the St. Louis arsenal Placed in command of the St. Louis Department, he was instrumental in preserving Missouri to the Union. He attacked a large force at Wilson's Creek, near Springfield, and was killed in battle. He left his entire fortune of $30,000 to the government for carrying on the war.

**Lyons,** a city of France, the capital of the Department of the Rhône, the third city in the country in population and the second in industrial importance, situated at the confluence of the rivers Rhône and Saône, 218 m. by rail n.w. of Marseilles. There are several bridges spanning the rivers, and the streets are wide and airy. The notable buildings include the celebrated Church of Notre Dame de la Fourvière, the cathedral of St. Jean, begun in 1110, the Hôtel-de-Ville, the Palais des Arts, which has several museums and a library, the Grand Theater and the Exchange. The University of Lyons has an attendance of 2600 students and ranks next to that of Paris. There are also technical and art schools, libraries, hospitals, rich museums and charitable institutions.

The industries include the manufacture of dyes, perfumes, soap, laces and hats. The printing establishments have

long been distinctive. The silk manufactures are very valuable and give employment to large numbers; a large part of the raw silk brought to Europe is prepared in Lyons, and one-half of the prepared silk is exported, the rest being used in local industries. Leather and skins are prepared and the machine shops and ironworks are extensive. The Exchange of Lyons is practically independent of that of Paris, and Lyons is an important financial center. It was formerly the Gallic town of Lugdumum. In 1320 it received a municipal charter. It has suffered from massacres, floods and labor riots, but has enjoyed recent marked prosperity. Population in 1906, 472,114.

**Lyons, Gulf of,** an arm of the Mediterranean Sea, on the southeastern coast of France. It receives the waters of the Rhône River. Sand bars are an obstruction to navigation. On its shores are the towns, Marseilles, Cette and Toulon.

**Lyre,** *Lire,* a stringed musical instrument of ancient origin. It consisted of two branching arms extended upward and joined near the top by a crosspiece, from which the strings were stretched to the bottom of the body. The number of strings varied with the shape of the frame. Some instruments had two and some as many as 12 strings. There was no keyboard or other means of changing the tone of the strings. The lyre was in general use among the ancient Egyptians and Greeks, but its origin is unknown.

**Lyre Bird,** a family of birds inhabiting Australia. Of the three species the common lyre bird is perhaps the best known. It is about the size of a domestic fowl, and its general color is olive-brown, with a reddish tinge on the wings and throat. The peculiarity from which the bird receives its common name is the long tail feathers, which stand erect and resemble in outline an ancient lyre. The two outer tail feathers are the largest and are curled outward at the end. The outer tail feathers are very fine, consisting of the central shaft with a number of fine barbs, which resemble the strings of the lyre. These birds are solitary in habit, a pair usually being seen together. The male possesses a variety of notes, which may be classed as a song of some merit. It is also a good imitator of the sounds made by other birds. The nest is placed on a projecting ledge of rock and is made of large sticks and lined with bark and rootlets. It contains one large, dark-colored egg.

**Lysan'der** ( ?-395 B. C.), a Spartan general. He won a decisive victory over the Athenian fleet at Ægospotami in 405 B. C., which was followed by the surrender of Athens. This brought to an end the Peloponnesian War and marked the downfall of Athenian supremacy. In 395 B. C. he was sent as commander of an army against the Bœotians, and was killed in that expedition.

**Lys'ias** (about 450 B. C.-380 B. C.), a Greek writer, the third of the ten Attic orators. At the age of 15 he went to Thurii in southern Italy, where he studied rhetoric, but in 412 B. C. removed to Athens and engaged in shield manufacturing. Forced to flee during the turbulent reign of the Thirty Tyrants, he escaped to Megara, returning in 403 B. C. He now became a writer of speeches for others to deliver, in which he was very successful. About 34 of his orations are extant. His writings were characterized by purity of diction, brevity, clearness and simplicity.

**Lysippus,** a Greek sculptor who flourished between 360 and 316 B. C. He was head of the school of Argos and Sicyon and was noted for the number of his works, over 1500. A number of these were of colossal size. His statues differed widely from those of his predecessors in the proportions of men. He made the body more slender and the head smaller, thus conveying the impression of greater height. A number of his statues of the gods were famous, and many of them were colossal figures in bronze. He also made a number of statues of Alexander the Great, in which he idealized his subject, giving such satisfaction that he became sculptor to the King.

**Lyte, Henry Francis** (1793-1847), an English clergyman and hymn writer,

born near Kelso, England, and educated in Trinity College, Dublin. His first curacy was near Wexford, Ireland. He went to England in 1823 and settled in the Parish of Brixham. He attained a wide reputation through his hymns and other poems, chiefly religious. His best-known hymns are *Abide with me! Fast Falls the Eventide; Jesus, I my Cross Have Taken; Praise my Soul, the King of Heaven;* and *Pleasant are Thy Courts Above.* In 1844 Lyte went to Italy, where he died at Nice three years later.

**Lyt'ton, Edward Robert Bulwer** (1831-1891), first Earl of Lytton, an English poet and statesman, born in London. As a poet he used the pen name, Owen Meredith. He was the only son of the first Baron Lytton. After studying at Harrow and at Bonn, Germany, he entered the diplomatic service in 1849. In 1876 he was appointed governor-general of India, in which position he remained until 1880, the chief events of his administration being the proclamation of Queen Victoria as Empress of India, the great famine and the Afghan War. In 1887 he was made ambassador to Paris. His verse possessed narrative power and an easy metrical style. Among his works are *Lucile, Glenaveril, Clytemnestra* and *Fables in Song.* He published *Life, Letters and Literary Remains of Edward Bulwer* in 1883.

# M

**MABIE,** *Ma' be,* **Hamilton Wright** (1846- ), an American essayist, critic and lecturer, born in Cold Spring, N. Y. After graduating at Williams College and at the law school of Columbia University (New York), he became associate editor of *The Outlook,* formerly the *Christian Union.* His keen appreciation of literature and his close touch with nature and spiritual life have been widely disseminated by means of the extensive lecture work which he has carried on throughout the United States. He has revealed an interest in appreciation and interpretation of literature, rather than in scholarship. His writings include *Nature in New England, My Study Fire, Essays in Literary Interpretation, Essays on Books and Culture, Fairy Tales Every Child Should Know, The Great Word, Christmas Today, Introduction to Notable Poems* and *Norse Stories, Retold from the Eddas.*

**McAl'ester, Okla.,** a city and the county seat of Pittsburg Co., about 85 m. s.w. of Fort Smith, Ark., and about 110 m. s.e. of Guthrie, on the Chicago, Rock Island & Pacific, the Missouri, Kansas & Texas and other railways. An electric trolley line connects it with places in the vicinity. There are rich iron and coal deposits near by, and coke making is an important industry. The industrial plants include iron foundries, cotton gins and compresses, a flour mill and brick plants. In the city is a fine Scottish Rite Masons' consistory and temple. The first settlement in the vicinity was made in 1885. South McAlester, as the place was then called, was incorporated in 1899; seven years later the adjoining town of McAlester was annexed and its name adopted for the new city. Population in 1910, 12,954.

**Macaroni,** *Mak" a ro' ny,* a nutritious food made from the best quality hard-wheat flour. The flour is first mixed into a dough, which is placed in a cylinder with a perforated base. A plunger forces the dough out through the holes in the base, forming the macaroni sticks, which are cut into lengths of ten feet and dried. Smaller sticks are called vermicelli or spaghetti. Macaroni is manufactured in large quantities in Italy and to a considerable extent in France and the United States. Under modern methods the work is done almost entirely by machinery.

**MacArthur,** *Mak Ar' thur,* **Arthur** (1845-1912), an American general, born in Massachusetts. He began his military career as a soldier in the Civil War in 1862. Four years later he received a first lieutenant's commission in the regular army and a little later was made infantry captain. He served in the war with Spain, rising to the rank of brigadier-general of volunteers in 1898, and very soon to that of major-general, commanding the second division stationed at Havana. He went to the Philippines in 1899, where he ultimately became military governor. He was made major-general in the regular army in 1901, and five years later lieutenant-general, retiring in 1909.

**Macaulay,** *Ma kol' y,* **Thomas Babington,** LORD MACAULAY (1800-1859), an English historian, essayist and statesman, born at Rothley Temple, Leicestershire. He was a precocious child, reading at the age of three and writing a *Compendium of Universal History* at seven and several poems and ballads before he was 12. At Cambridge he won distinction as a debater and a scholar; in literature he leaped into sudden fame by his brilliant and eloquent, though crude, essay on Milton, which was published in the *Edinburgh Review* in 1825. He took little interest in law—he was admitted to the bar in 1826—but in Par-

liament he soon became one of the most prominent members of the Whig Party. An ardent supporter of the Reform Bill, his speeches were delivered with consummate skill and his contemporaries recognized him as an orator of the highest ability. Living in one of the most exciting periods of English domestic history, he found opportunity to exercise wide and permanent influence during the long years of public service which followed. He was in India for four years as legal adviser to the Supreme Council, returned to England in 1838 and was twice again in Parliament and once in the cabinet. In 1846 he was appointed paymaster-general, and lost his seat in Parliament the following year because he was too zealous an advocate of religious toleration. He was elected lord rector of the University of Glasgow in 1849, and was honored with the title of Baron in 1857.

During his active political life and the period of comparative quiet and retirement that followed his refusal of the professorship of modern history at Cambridge, Macaulay devoted himself with great fervor to writing. His ballads, the *Lays of Ancient Rome,* published in 1842, were soon followed by a series of essays on men prominent in literature, a group of biographies and appreciations, keen, lively and concrete. A greater work, however, was his *History of England from the Accession of James the Second.* The sale of the volumes was enormous. There were faults of inaccuracy and partiality in the work, but so brilliant and detailed a historical narrative, such admirable scholarship and such unreserved interest in an age that had passed, had yet not been attained among English men of letters. His style was vigorous, conservative, clear and forceful, revealing the thinking of a man of exceptional talent. He cared little for science or philosophy but substituted instead the practical insight that comes of an intimate knowledge of public affairs, and his abundant use of illustrations revealed a marvelous and prodigious memory.

**Macaw,** *Ma kaw',* a name applied to certain parrots inhabiting South America. They are mostly large birds with long tails and large, heavy bills, the upper mandible of which is much longer than the lower. They are usually gaudy of color. The largest species is the blue and yellow macaw, which is nearly three feet in length, and is blue above, yellowish-orange below and olive-green on the sides of the neck and the forehead. The tail and wings are blue above and olive-yellow or golden below. This species, known by its incessant screeching, is native from Panama south to Bolivia.

The green macaw may be known by its green plumage, with a scarlet spot on the forehead and a blue patch on the wings, tail, back and rump. Both species are familiar in zoological gardens. About 20 species of macaws are known.

**Maccabees,** *Mak' a beez,* the name given a prominent Jewish family flourishing 167-37 B. C. The surname Maccabæus belongs properly only to Judas, the most important member of the family, but has been applied to the other members. The Maccabees first came into prominence when the ruler of Syria, Antiochus Epiphanes (175-164 B. C.), attempted to force the Jews into idolatry. The aged priest Mattathias and his five sons—Jochanan, Simon, Judas, Eleazar and Jonathan—at once set up a revolt. Upon the death of Mattathias, 166 B. C., Judas headed the forces of rebellion, defeating four Syrian armies in succession. In 165 B. C. he restored Jewish worship at the Temple, and was endeavoring to achieve political independence for the Jews when he was killed in battle, 161 B. C. The leadership now fell to Jonathan, who became the acknowledged civil, military and religious head of Judea. In 143 B. C. he was treacherously murdered and was succeeded by his brother Simon. The latter secured complete independence for the Jews in 142 B. C., and the following year was made high priest and civil and military head of the Jews. In 135 B. C. Simon was murdered and was succeeded by his son Hyrcanus. Jewish independence came to an end with the

capture of Jerusalem by Pompey, in 63 B. C., and the Maccabæan line became extinct in 37 B. C.

**Maccabees, Knights of the,** a fraternal order organized in 1883, and now represented by a membership of 375,575, with headquarters at Port Huron, Mich. Over $250,000 has been paid as benefits in cases of illness and death. The Ladies of the Maccabees is an affiliated order.

**MacCarthy,** *Ma Kar' thy,* **Hamilton** (1847- ), a celebrated sculptor, born in London, England, and educated there and on the Continent. Having exhibited at the Royal Academy, London, and having executed commissions for Queen Victoria, the King of the Belgians and the Corporation of the City of London, he came to Canada in 1885. His work there included a public monument to Sir John A. Macdonald in Queen's Park, Toronto; a collaboration with Hébert for the monument to Mackenzie on Parliament Hill, Ottawa; various bronze memorials to the South African heroes; and monuments to De Monts and Champlain. Moreover, he modeled many portrait busts for the Educational Museum in Toronto, designed the bronze group of Burns and Highland Mary in Victoria, and made the coat of arms at the entrance of the Ottawa Mint. Mr. MacCarthy has lectured on art in Canada and Great Britain and has written some admirable verse.

**McCarthy, Justin** (1830-1912), a British author, born at Cork, Ireland. In 1853 he was on the staff of the *Northern Daily Times,* Liverpool, and 11 years later was editor-in-chief of the London *Morning Star.* He visited the United States from 1864 to 1867, contributing to magazines and doing some work in connection with the New York *Independent.* Returning to England, he accepted a position on the staff of the *Daily News.* He became a member of the House of Commons in 1879, but continued his literary work. He wrote several novels, among which are *Paul Massie, The Waterdale Neighbours, Roland Oliver* and *Maid of Athens.* His historical and biographical works are *History of Our Own Times, A History of the Four Georges, Epoch of Reform, Life of Sir Robert Peel, Life of Pope Leo XIII, Modern Leaders, Reminiscences* and *The Story of Mr. Gladstone's Life.*

**McClel'lan, George Brinton** (1826-1885), an American soldier, born in Philadelphia and educated at West Point. He took part in the Mexican War and for gallantry at Contreras, Churubusco and Chapultepec was brevetted lieutenant and captain. Later he was instructor in bayonet exercise at West Point, where his *Manual,* translated from the French, became the textbook, and he explored and surveyed the Red River, the harbors of Texas and the western part of a proposed Pacific railway route, with a direct route to Puget Sound. In 1855 he served on the commission which studied the organization of European armies and watched the Crimean War. Subsequently he engaged in civil engineering and was identified with a number of railroad enterprises. At the outbreak of the Civil War he was commissioned major-general of Ohio volunteers, after the first engagement of Bull Run succeeded McDowell, in command of the Army of the Potomac, and in November, 1861, on the retirement of General Scott, became commander-in-chief of the United States armies. In this capacity he successfully organized the raw recruits; but his campaign against Richmond in the spring of 1862, with the Army of the Potomac, was a failure, and in consequence he was removed as commander-in-chief. He later, by battles at South Mountain and Antietam, drove Lee out of Maryland; but his dilatoriness in following up this victory caused dissatisfaction at Washington, and, upon being superseded by Burnside, McClellan resigned from the army on Nov. 8, 1864. He was the unsuccessful presidential candidate against Lincoln in 1864, and in 1877 he was elected governor of New Jersey.

**McCler'nand, John Alexander** (1812-1900), an American soldier, born in Breckenridge County, Ky. He was early taken to southern Illinois, where in 1832 he was admitted to the bar. He saw

service in the Black Hawk War, and was editor of the Shawneetown (Ill.) *Democrat.* At the outbreak of the Civil War he was appointed brigadier-general and distinguished himself at Belmont and Ft. Donelson. As major-general of volunteers he was division commander at Shiloh, and in January, 1863, he succeeded General Sherman in command of the army engaged in the Vicksburg campaign, holding this position until superseded by General Grant.

**McClos'key, John** (1810-1885), an American Roman Catholic cardinal, born in Brooklyn and educated at Mount St. Mary's College, Emmitsburg, Md., and in Rome and France. After his ordination to the priesthood in 1834 he was, successively, pastor of St. Joseph's Church, New York, president of St. John's College, Fordham, N. Y., coadjutor to Bishop Hughes of New York and, in 1847, Bishop of the new Diocese of Albany. His administration of this see was made notable by the erection of the cathedral at Albany, the founding of the school of theology at Troy, and the establishment of various charitable and religious institutions. Having succeeded Archbishop Hughes of New York in 1864, Father McCloskey was appointed a cardinal in 1875. A deep scholar, able administrator and effective preacher, he was also a man of earnest piety.

**McClure, Samuel Sidney** (1857- ), an American editor, born in Antrim County, Ireland. He was educated at Knox College. In 1884 he established a newspaper syndicate, and in 1893 he became president of S. S. McClure Company and founded and became editor of *McClure's Magazine.*

**McCook, Alexander McDowell** (1831-1903), an American soldier, born in Columbiana County, Ohio, and educated at West Point. He was colonel of the First Ohio Regiment at Bull Run, and in July, 1862, having distinguished himself at Shiloh and Corinth, became major-general of volunteers. He was corps commander at Perryville, commanded the right wing at Murfreesboro and was conspicuous at Chickamauga. In April, 1895, he was retired with the full rank of major-general.

**McCor'mick, Cyrus Hall** (1809-1884), an American inventor, born in Walnut Grove, in what is now West Virginia. He was the inventor of the McCormick harvester, first introduced in 1831, and continuously improved. In 1847 McCormick moved to Chicago and engaged in the manufacture of his machines. He amassed a large fortune, endowed a chair in Washington and Lee University at Lexington, Va., and established McCormick Theological Seminary at Chicago, under the management of the Presbyterian denomination. He and his heirs have given more than $1,000,000 to this institution. See REAPING MACHINE.

**McCosh,** *Ma Kosh',* **James** (1811-1894), an eminent Scotch-American educator, born in Ayrshire, and educated in the universities of Glasgow and Edinburgh. He won fame as a philosophical thinker by publishing in 1850 *The Method of the Divine Government, Physical and Moral.* For the next 18 years he was professor of logic and metaphysics in Queen's College, Belfast, and from 1868 to 1888, president of the College of New Jersey (now Princeton University). During these 20 years the endowment was largely increased, the institution was put upon a university basis and the number of professors and students was doubled. Until his death, Dr. McCosh continued to serve as a lecturer in philosophy. Among his works are *The Emotions, The Supernatural in Relation to the Natural* and *Psychology of the Motive Powers.*

**McCrea,** *M'Kra,* **James** (1848-1913), an American railway president, born in Philadelphia and educated at the Pennsylvania Polytechnic College. Upon graduation he entered the railroad service as a rodman, and worked in this capacity and as assistant engineer for the Connellsville & Southern Pennsylvania Railroad until 1867. His promotion was rapid and steady through the successive positions of manager, division superintendent, general manager and fourth vice-president of the Pennsylvania lines

until he became the president, in 1907. Under his administration the road planned and carried out the construction of the great tunnels under the Hudson River and of the magnificent terminal station in the heart of the metropolitan district of New York City. Mr. McCrea was also president of the Pittsburgh, Cincinnati, Chicago & St. Louis, the Philadelphia, Baltimore & Washington, the Northern Central and the West Jersey & Seashore railroads. He was considered one of the able railway builders of the country.

**McCulloch,** *Ma Kul' uk,* **Hugh** (1808-1895), a secretary of the United States treasury, born in Maine. He attended Bowdoin College, studied law, and began practice in Fort Wayne, Ind. Later he entered the banking business there. In 1863 he accepted the newly-created office of national comptroller of the currency; and in 1865 was appointed secretary of the treasury by President Lincoln, holding office throughout Johnson's administration. He rendered great service to the nation in providing for the enormous obligations of the government at the close of the war and in funding the public debt. In 1884-85 he was again secretary of the treasury.

**McCut'cheon, George Barr** (1866- ), an American novelist, born in Indiana and educated at Purdue University. In 1889 he entered upon a journalistic career, becoming reporter for the Lafayette *Journal,* and, later, city editor of the Lafayette *Courier.* Since 1901 he has been writing popular fiction, including novels and short stories for various magazines. His writings show originality, and his plots are often unusual. Among his novels are *Graustark, Brewster's Millions, Beverly of Graustark, Nedra, Jane Cable, The Rose in the Ring* and *Her Weight in Gold.*

**McCutcheon, John Tinney** (1870- ), an American cartoonist and special news correspondent, born in Tippecanoe County, Ind. Mr. McCutcheon graduated from Purdue University in 1889. In 1896 he became correspondent of the Chicago *Record,* and his cartoons immediately attracted wide attention. Still acting as correspondent he made a tour of the world in a dispatch boat, being of special service in Korea, Japan, Siam, China, Burma and India. During the Spanish-American War he accompanied a military expedition to the Philippines. He also joined the Boers of South Africa in the interests of his paper. In 1900 he furnished the political cartoons for the *Record-Herald,* Chicago, and later became cartoonist for the Chicago *Tribune.* He is author of *Stories of Filipino Warfare* and *Cartoons by McCutcheon.*

**Macdonald,** *Mak don' ald,* **George** (1824-1905), a Scottish novelist, born at Huntley, Aberdeenshire, and educated at Aberdeen University. After studying for the ministry at the Independent College, London, he began preaching, later retiring on account of ill health. His first publications were volumes of verse; these were followed by several novels, which, though not well constructed, have a high moral tone and are of considerable interest. Macdonald visited the United States in 1872-73 on a lecturing tour. Among his writings are *The Gifts of the Child Christ and Other Poems, Robert Falconer, Wilfrid Cumbermede. Malcolm, Lilith, At the Back of the North Wind* and *Unspoken Sermons.*

**Macdonald, James Alexander** (1862- ), a Canadian journalist, born in Ontario, and educated in Edinburgh University and Knox College, Toronto. He was Presbyterian pastor of Knox Church, St. Thomas, Ontario, from 1891 to 1896, when he became editor of *The Westminster* and, subsequently, of the *Canadian Presbyterian.* In 1902 he became chief editor of the Toronto *Daily Globe.* Dr. Macdonald is known throughout Canada and the United States as a public speaker, his repertoire including *The Place of Canada Among the Nations, The Significance of Lincoln* and *America's Part in the Peace of the World.* He has, moreover, distinguished himself as a press and magazine writer. In 1911 he became director of the World's Peace Foundation.

**Macdonald, Sir John Alexander** (1815-1891), a Canadian statesman and first premier of the Dominion, born in Glasgow, Scotland. When he was a child, his parents came to Canada and settled in Kingston, Ontario. Macdonald began the study of law at 15 years of age, and was admitted to the bar when he was 21. The next year the rebellion in Canada broke out, and the years immediately following were full of events well calculated to stimulate political thought. Macdonald's first public office was that of alderman in Kingston. In 1844 he was elected to the Legislature of Ontario as a Conservative, and from this time on his influence and power in public affairs continued to increase. He was successively a member of the Executive Council, receiver-general, commissioner of public lands, attorney-general, minister of militia and minister of justice.

From the beginning of his public career, Macdonald saw clearly that the prosperity of Canada depended upon the union of the various provinces under a general government, and a close affiliation of that government with the Government of Great Britain, and he gave much of his time and energy to securing these ends. He was the leader in securing the formation of the Confederation and naturally became the first prime minister of the Dominion. In this position he was confronted by many intricate and perplexing problems, but such was his ability in administrative affairs that the leaders of all opposing forces looked to him to harmonize the various conflicting interests. This he did during his first term. In 1874 the Liberal Party came into power, but in 1878 the Conservatives returned and Sir John was again made premier, which position he held the remainder of his life.

He was the leading spirit in the construction of the Intercolonial and the Canadian Pacific railways, each among the largest railway projects ever undertaken. His guiding hand also shaped much of the legislation which bound the provinces together into a nation and which laid the foundation for Canada's growth and prosperity. A man of unusual sagacity, power and determination, Macdonald was one of the leading statesmen of his time, not only in Canada but in all the British Empire. His statue adorns public parks in many Canadian towns and cities, and he has a memorial in St. Paul's, London.

**Macdonough,** *Mak don' o,* **Thomas** (1783-1825), an American naval officer, born in Delaware. In 1800 he entered the navy as midshipman, later serving against the Barbary States, and in the early War of 1812 was lieutenant on the *Constitution,* being commissioned to build a fleet on Lake Champlain, September, 1812. For his victory over a British fleet under Captain Downie, at Plattsburg, Sept. 11, 1814, he was made captain and awarded a gold medal. He died at sea. McMaster declared Macdonough the greatest American naval commander before the Civil War.

**McDougall,** *Mak Doo' gal,* **John** (1842- ), a Canadian missionary and author, born in Ontario and educated at Victoria University. Raised among the Indians of Georgian Bay and Lake Superior, he spoke Indian before he learned English. In 1860 he moved to the North West Territories, where he successively taught school, was an interpreter, and entered the Methodist ministry, thereafter spending many years among the Indians. He has written and lectured extensively on topics pertaining to frontier life and the Western Indians.

**McDow'ell, Irvin** (1818-1885), an American soldier, born at Columbus, Ohio, and educated at a military school in France and at West Point. In May, 1861, he became brigadier-general of volunteers, with command of the Army of the Potomac. Following his defeat at the first Battle of Bull Run, he was relieved of command by McClellan, under whom he became corps commander and defended Washington. In April, 1862, when McDowell was a major-general of volunteers, his corps was detached from the Army of the Potomac and he was

given charge of the Department of the Rappahannock. He was prominent at Cedar Mountain and Bull Run. Early in 1865 he was brevetted major-general for action at Cedar Mountain, in 1872 he became full major-general, and, having been in command of the departments of the East, of the South and of the Pacific, he retired in 1882.

**Mace,** *Mase,* an aromatic spice made from the membranous covering of the nutmeg. When the fruit ripens, the tough, leathery skin parts at the top, disclosing the nut surrounded by a scarlet membrane. This coat, when dried and powdered, forms the mace of commerce used for culinary purposes where foods are to be highly spiced. Mace is prepared wherever nutmeg trees are grown; namely, Java, Sumatra, Ceylon, China and the West Indies. See NUTMEG.

**Mace,** a weapon of war formerly in use in Europe, chiefly among the cavalry as late as the 16th century. It consists merely of a staff about five feet long with a knob at the end made of iron or other heavy substance. It is used as an emblem of authority. In the English House of Parliament it occupies a prominent position during every session but is rarely seen in the United States Congress. The only occasions on which it appears is when members forget decorum and engage in controversies or personal encounters beyond the control of the presiding officer. At such times the sergeant at arms carries it in full view of all members, where its presence commands peace.

**Macedonia,** *Mas" e do' ni a,* an ancient country of southeastern Europe, north of Thessaly. The real importance of Macedonia in history began with Philip (382-336 B. C.). He found the people a loose union of tribes, which he consolidated into a strong kingdom. By shrewd diplomacy and by war Philip gained the Thracian cities of Athens and drew enormous revenues from the gold mines which he developed. By 348 B. C. every Greek city on the Macedonian coast had fallen before him. By 338 he was master of Greece.

Under Alexander the kingdom was greatly enlarged (See ALEXANDER THE GREAT). In 146 B. C. Macedonia became a Roman province and it was a part of the Eastern Empire in 395 A. D. In the 14th century it came under Turkish rule, remaining a part of the Turkish Empire until 1913, when it was divided among Servia, Bulgaria and Greece.

**McGill College and University,** at Montreal, Canada, was founded in 1821 by Hon. James McGill, who left an estate of about $120,000 for the purpose, with the provision that one of the colleges should always be known as McGill College. Through the generosity of others, additional schools have been established from time to time. The university library and Peter Redpath Museums were gifts of Peter Redpath. The university maintains faculties of art, law, medicine and science, and there are four affiliated theological schools. The degrees in the faculty of arts are open to both men and women. McGill is affiliated with the universities of Oxford, Cambridge and Dublin, with the University of Toronto and a number of other colleges and universities of Canada. The government is in the hands of a board of governors, 15 in number. The governor-general of Canada, as representative of the Crown, exercises supreme authority. The president of the board of governors is ex-officio chancellor. The executive head of the university, however, is the vice-chancellor, who is styled principal. The university occupies a beautiful site in Montreal, has property valued at about $2,500,000 and an enrollment of over 1200.

**Machiavelli,** *Mah" kyah vel' le,* **Niccolò** (1469-1527), an Italian statesman and man of letters, born at Florence. After securing a liberal education, he entered public life in 1494 when the Medici were expelled from Florence. In 1498 he became secretary of the Board of Ten, which exercised the civil and military powers of the Florentine Republic established by Savonarola. For 14 years he occupied this position and helped to guide the destinies of his coun-

try. When the Medici returned to power in 1512, Machiavelli retired to his country house, and the remaining years of his life were devoted to writing, chiefly on political subjects. He was a keen observer of men and a true patriot, with a burning desire for the welfare of Italy. His most noted writing, *The Prince,* advocates the political policy expressed in the adage, "The end justifies the means," which has come to be known as "Machiavellianism." He also wrote valuable reports upon his diplomatic missions and upon foreign affairs, a *History of Florence* and *Discourses upon the First Ten Books of Livy.*

**Machine,** *Ma sheen',* **Gun,** a gun in which loading, firing and extracting the empty shell are performed by machinery. These guns use the same cartridge as the infantry rifle, are worked by one or two men and can fire 20 shots per second. They are, therefore, very useful to supplement a deficient infantry fire. These guns can be fired from carriages, parapet mountings or tripods, can be carried either on carriages or pack animals, and are particularly serviceable for accompanying cavalry. There are two classes of machine guns, those operated by hand and those operated by utilizing the gases from the burnt powder. The Gatling and Gardner guns belong to the former class; the Colt, Hotchkiss, Yamanouchi, Maxim-Nordenfeldt and Dawson-Silverman, to the latter. In the United States and England machine guns are assigned to cavalry and infantry. In Germany one detachment is assigned to each army corps. See ARMY; GATLING GUN.

**Machines, Simple,** known also as the mechanical powers, the fundamental devices by which the amount or mode of application of a force is changed for the purpose of gaining some practical advantage. They are the lever, the rope and pulley, the wheel and axle, the inclined plane and the screw, each of which is described under its title.

**McIlwraith,** *Mak' Il rathe,* **Jean Newton,** a Canadian author, known as Jean Forsyth, born in Ontario and educated in Hamilton Ladies' College. Her first story appeared in *Harper's Bazaar* in 1890, and four years later she appeared in *Harper's Magazine,* having since contributed to such periodicals as the *Cornhill* and *Atlantic Monthly.* Her later works include *A Book about Shakespeare, Canada* in the Children's Study series, *A Book about Longfellow* and *The Life of Governor-General Sir Frederick Haldimand* in The Makers of Canada series.

**Mackay,** *Ma ki',* **John William** (1831-1902), an American capitalist, born in Dublin, Ireland. Early removing to New York, after 1851 he worked in mines in California and Nevada, where in 1872 he discovered the Bonanza mines, of which he owned two-fifths. He was founder and president of the Nevada Bank of San Francisco, and in 1844, with James Gordon Bennett, founded the Commercial Cable Company and Postal Telegraph Company. Subsequently he was interested in laying the American Pacific cable (See CABLE, SUBMARINE). He died in London.

**McKees'port, Pa.,** a city of Allegheny Co., 14 m. s.e. of Pittsburgh, at the junction of the Monongahela and Youghiogheny rivers, and on the Pennsylvania, the Baltimore & Ohio, the New York Central and the Western Maryland railroads. Eight modern bridges span the rivers and a number of electric lines connect the city with the adjoining borough of Glassport and with Duquesne across the Monongahela River. There is also excellent electric service to Pittsburgh, Homestead, Braddock, and other towns and cities of the thickly populated district. McKeesport covers an area of over 13 sq. m. and is situated in the beautiful Monongahela Valley, in the heart of the bituminous coal and natural-gas regions of the state, and is the seat of a vast iron and steel industry. There is also an important trade in coal and lumber. The city contains many miles of well-paved streets, many beautiful residences and a number of public parks, Olympia Park being the largest.

The public buildings include a Federal Building, city hall, numerous banks, a

Y. M. C. A. and a Carnegie library. There are about 45 churches. The educational institutions include a high school, public and parish schools, and Douglass Business and Duff's Commercial colleges. The McKeesport Hospital is a well-equipped institution. McKeesport has an important position among the industrial cities and is noted for its extensive output of iron and steel. The city contains one of the largest tube and pipe works in the world. There are also extensive blast furnaces, tin-plate works, rolling mills, foundries and machine shops, sewer-pipe works, glass factories, artificial-ice plants, planing mills, boat and barge yards, carriage and wagon factories, ax and tool works, fire-brick plants, candy factories and manufactories of flavoring extracts, medicine, women's garments, water and gas meters, spikes and rivets, brass fittings, lacquered ware, coke and coal-tar products, wire articles and carbonated waters. The city contains a distillery and several breweries. There is a large river tonnage.

The first white settler was David McKee, a pioneer from Scotland. In 1769 the colonial government granted him a charter to operate a ferry over the rivers at their confluence. His son, John McKee, founded the town in 1795 and named the place McKeesport in honor of his father. Coal was discovered in 1830. On July 28, 1898, parts of Versailles Township were annexed, and in 1890 the borough of McKeesport was chartered as a city. Population in 1910, 42,694.

**McKees' Rocks, Pa.,** a city of Allegheny Co., 5 m. s.e. of Pittsburgh, on the Ohio River and on the Pittsburgh, Chartiers & Youghiogheny and the Pittsburgh & Lake Erie railroads. The town was settled by John McKee in 1830 and incorporated as a borough in 1892. It has important steel and iron works, car shops, lumber and flour mills, glassworks, etc. McKees Rocks borough is now a part of Stowe Township, which was annexed in 1907. An ancient Indian mound is one of the interesting features of the place. Population in 1910, 14,702.

**McKen'na, Joseph** (1843- ), an American jurist and statesman, born at Philadelphia, Pa. His father moved his family to California when Joseph was 12 years old. He studied in the public schools, and at the college of St. Augustine, finally taking a law course and beginning to practice at the age of 22 years. He became county attorney, then went to the State Legislature, and in 1884 was elected to Congress, serving four terms, until 1892, when he was made a judge of the United States Circuit Court. He was appointed attorney-general in McKinley's cabinet in 1897. In 1898 he became a justice of the United States Supreme Court.

**Mackenzie,** *Ma ken' ze,* **Alexander** (1822-1892), a Canadian statesman, born in Perthshire, Scotland. He moved to Kingston, Canada, when he was 20 years of age. He was a stone mason and began in Canada as a builder and contractor, continuing in this business until he became a member of the Parliament of Ontario in 1861. Nine years before this, however, he began editing a Liberal newspaper. He entered the Dominion Parliament in 1867 and became a Liberal leader. From 1873 to 1878 he was premier, and he was a member of Parliament until his death. He declined the honor of knighthood three times. Makenzie was a gifted orator and a wise statesman whose influence is still felt.

**Mackenzie, Sir Alexander** (1755-1820), an explorer, born in Inverness, Scotland. He emigrated to Canada in 1775, later entering the service of the Northwest Company. In 1789 he set out from Ft. Chippewyan, exploring to its mouth the river bearing his name. On a second exploring expedition, undertaken three years later, he ascended the Peace River, and, crossing the Rocky Mountains, followed the Fraser for a time, then made for the Pacific Ocean by an overland route. In 1802 he was knighted and in the same year was published his *Voyages,* the record of his explorations.

**Mackenzie, Sir Morell** (1837-1892), an English physician, born in Leyton-

stone, Essex. He was educated in London, Paris and Budapest. From 1860 to 1874 he was connected with the London Hospital, and in 1863 he founded the London Throat Hospital. Operative skill in his specialty soon made him famous, and, following his attendance on the German Emperor Frederick III, who was attacked with cancer of the throat, he was knighted by Queen Victoria and honored by Germany. He wrote widely on his chosen subject.

**Mackenzie, Sir William** (1849- ), a Canadian capitalist, born in Ontario. He early constructed part of what is now the Midland Division of the Grand Trunk Railway, and a portion of the Mountain Division of the Canadian Pacific, in 1886 entering into partnership with Sir Donald Mann. He has since constructed over 3000 miles of railroad in the Northwest, which he owns and operates, besides 2000 miles in eastern Canada. Sir William is also owner of the Royal Line of Ocean Steamships and has many other business connections, which cause him to rank among the 23 men at the financial basis of Canada. On Jan. 1, 1911, he was knighted by King George.

**Mackenzie, William Lyon** (1795-1861), a Canadian statesman, born in Scotland. In 1820 he moved to Upper Canada and made his home at Toronto. In 1824, he founded a paper called the *Colonial Advocate,* in which he freely opposed certain governmental measures. He was elected several times to the Legislature of Upper Canada, but was refused a seat because of his attitude toward the government. He was a delegate to England in 1832 to secure the redress of certain wrongs and to advocate reforms, in both of which he was successful. After his return from England he was for three years mayor of Toronto. During this time he organized an insurrection which broke out in 1837. He was defeated by the Canadian troops and took refuge in the United States, where he endeavored to raise an army to invade Canada. The United States Government stopped the movement. Mackenzie then took up newspaper work in New York City, until the Canadian amnesty of 1849, when he returned to Toronto. He was again elected to the Legislature, serving from 1850 to 1858.

**Mackenzie River,** a river of northwestern Canada, rising in Great Slave Lake in southern North West Territories. With the Athabaska River, which empties into Lake Athabaska, and the Great Slave River, which connects Lake Athabaska and Great Slave Lake, this forms one of the great river systems of the continent. From the last-named lake the Mackenzie flows northwest, entering Mackenzie Bay, an arm of the Arctic Ocean, by means of a long estuary. The river is wide and has a gentle current uninterrupted by falls or obstructions for fully 1100 m.; its total length is about 2300 m. The northern part of its course is covered with ice fully nine months of the year. See ATHABASKA RIVER; ATHABASKA, LAKE.

**Mack'erel,** a family of important food fishes highly prized in America. Members of this family are found in great schools upon the New England coasts and in the Gulf of Mexico, where the uncertainty of their appearance gives a tinge of chance, making their capture a sport as well as an industry. Mackerel are slender fish with tapering bodies of graceful form and clean build. They are easily recognized by their forked caudal fin, two short, widely separated dorsal fins and numerous tiny, distinct fins, both dorsal and ventral, just before the caudal fin. In color mackerel are a beautiful combination of blue, black and silver. The average weight is from one and a half to two pounds.

Thousands of people in the New England States depend for their livelihood upon the mackerel catch, and in the United States this fish, whether fresh or salted, has ready sale. Mackerel schooners are among the trimmest of American fishing boats, and their catch is ordinarily the largest taken. European and Asiatic mackerel are coarser fish and not valued as food, though some species produce a useful oil. See FISHERIES.

**McKim', Charles Follen** (1847-1909), an American architect, born in Chester County, Pa., and educated at Harvard University and in Paris. He became a partner of W. R. Mead and Stanford White. Among his notable designs are those for the Boston Public Library, the library of Columbia University, the New York Century, Metropolitan and University clubs, and the Agricultural Building at the World's Fair held in Chicago in 1893. In conjunction with D. H. Burnham and F. L. Olmsted, Jr., he worked out the remarkable plan for the improvement of Washington, D. C., and also aided in the design of the Madison Square Garden, Washington Arch and Hall of Fame of New York University (all in New York City). His work everywhere shows a refined taste and a highly developed sense of decorative effects.

**Mackinac,** *Mak' i nak,* **Island,** a small island at the northwest extremity of Lake Huron, 260 m. n.w. of Detroit and 320 m. n. of Chicago. The island is about three miles long and two miles wide and most of it is densely wooded. The south and east sides present high limestone bluffs to the lake. In some places these are worn into fantastic forms. The entire island is noted for the charm of its scenery and is under the control of the State of Michigan as a state park. The village, which is on the south side of the islands, has fewer than 700 permanent residents, but its beautiful scenery and invigorating climate make it a popular summer resort, and during July and August the population is from 10,000 to 12,000. Ft. Mackinac occupies the bluff above the village, and in the government park below the fort is a heroic statue in bronze of Father Marquette.

**McKin'ley, William** (1843-1901), twenty-fifth president of the United States, born at Niles, Ohio. After a preparatory education he entered Allegheny College in Pennsylvania, but discontinued his studies after a year on account of ill health. He then taught school for a short time. In 1861 he enlisted in the Union army and served throughout the war, with especial gallantry at Antietam, Fisher's Hill and Cedar Creek, leaving the army with the rank of brevet-major. After the war he attended the Albany Law School, and was admitted to the bar in 1867, beginning practice at Canton, Ohio, which he thenceforth made his home.

He soon became interested in politics and gained prominence as a campaign speaker. In 1869 he became prosecuting attorney of the county. In 1876 he was elected to Congress on the Republican ticket, where he served until 1891, except for one term. In Congress he was an advocate of the high tariff, and, as chairman of the ways and means committee, framed the tariff law of 1890 which bears his name.

In 1891 McKinley was elected governor of Ohio, and was reelected in 1893, His administration was so satisfactory that he was nominated for the presidency of the United States by the Republican Party in 1896, and elected by both a popular and electoral majority over William Jennings Bryan, the Democratic nominee. In 1900 he was reelected over Bryan by a still larger majority. His administration was notable for the Spanish-American War, resulting in the independence of Cuba, and for the policy of territorial expansion, including the acquisition of the Philippines, Porto Rico and Hawaii. He was also an advocate of commercial expansion through reciprocity treaties with foreign nations.

In September, 1901, McKinley was assassinated at Buffalo, N. Y., where he had gone to deliver an address at the Pan-American Exposition. The remains were taken to Canton, Ohio, and a fitting monument has there been erected to his memory. For five minutes at the hour of his interment all business ceased throughout the country, and remarkable expressions of respect and sympathy were received from foreign countries. McKinley was universally esteemed for the purity of his life, his high ideals and his generous courtesy. As a statesman he was noted for his remarkably close touch with popular sentiment. Consult Peck's *Twenty Years of the Republic.*

**McKinley, Mount,** the highest mountain in North America, is situated in the south-central part of Alaska in the Alaskan Range. Its altitude is 20,464 ft. The summit is covered with snow, and there are extensive glaciers on the slopes.

**Mack'intosh, Charles Herbert** (1843- ), a Canadian journalist, born in Ontario. He entered newspaper work as the city editor of the London, Ontario, *Free Press,* and was subsequently associated with the Hamilton *Times,* Parkhill *Gazette,* Chicago *Journal of Commerce* and Strathroy *Dispatch.* In 1874 he acquired the Ottawa *Daily Citizen,* which he edited until 1892. Having been mayor of Ottawa from 1879 to 1881, he sat for Ottawa City as a Conservative from 1882 to 1887 and from 1890 to 1893, and was lieutenant-governor of the North West Territories, 1893-98.

**Maclaren, *Ma klar' en,* Ian,** *E'ahn.* See WATSON, JOHN.

**Maclaren, John James** (1842- ), a Canadian judge, born in the Province of Quebec and educated at Victoria and McGill universities and at the Montreal Royal Military School. Until 1884 he practiced law in Montreal, being counsel in many important cases and appearing before the Imperial Privy Council in a Supreme Court appeal. Until November, 1902, he was in active practice at Toronto, being then appointed a judge of the Supreme Court of Judicature for Ontario and a puisne judge of the Ontario Court of Appeals.

**Maclean, *Mak lane',* John** (1851- ), a Canadian author, born in Scotland and educated at Victoria University and at Wesleyan University, Illinois. He was ordained in the Methodist Church in 1880 and served as a missionary to the Blood Indians of Alberta till 1889. He has since held various pastorates in Saskatchewan and Manitoba. From 1902 to 1906 he edited *The Wesleyan,* and his works, some of which are under the pen name of Robin Rustler, include *The Indians of Canada, Our Savage Folk, Lone Land Lights, Better Lives for Common People* and *Science and the Bible.*

**Maclean, William Findlay** (1854- ), a Canadian journalist and legislator, born in Ontario and educated at Toronto University. He commenced his newspaper career with the Toronto *Daily Globe,* and in 1880 he established the Toronto *World,* of which he has been editor-in-chief. He entered the House of Commons in 1892, being a Conservative until 1905, when he assumed an independent position.

**MacMahon, *Mak" Ma" on',* Marie Edme Patrice Maurice de,** DUKE OF MAGENTA (1808-1893), a marshal of France and second president of the Third Republic, born at Sully. After graduating from the military school at St. Cyr in 1827, he saw active military service during the campaign of Algiers (1830) and at the siege of Antwerp (1832), and made a brilliant record in Africa. In 1852 he became a general of division and commander of the Legion of Honor. On his return to France from the Crimean War he received the Grand Cross of the Legion of Honor. In the war with Austria which began in 1859 MacMahon had a large share in the victories of Magenta and Solferino, but in the Franco-German War as head of the First Army Corps he sustained serious reverses, and his army was obliged to surrender after the defeat at Sedan. Following the establishment of the Third Republic he succeeded Thiers as president, holding this office from 1873 to 1879.

**McMas'ter, John Bach** (1852- ), an American historian, born in Brooklyn, N. Y. In 1872 he graduated at the College of the City of New York, spending one year in postgraduate work and becoming a civil engineer. He wrote on engineering subjects and in 1877 accepted a position as instructor in these subjects at Princeton, resigning in 1883 to accept the chair of history in the University of Pennsylvania. The first volume of his work entitled *A History of the People of the United States* appeared in 1883 and the eighth volume in 1912. This is a standard work, showing great research, especially in the pe-

riodical literature of the epoch covered. He has written two school histories of the United States; a life of Daniel Webster; *Benjamin Franklin as a Man of Letters; Origin, Meaning and Application of the Monroe Doctrine; With the Fathers;* and other works on both engineering and history.

**MacMonnies,** *Mak Mun' iz,* **Frederick William** (1863- ), one of the foremost American sculptors, also a painter. His mother was a niece of Benjamin West. For five years he served as an apprentice in the studio of Augustus Saint Gaudens, after which he went to Paris and Munich. His portrait of James S. T. Stranahan brought him a "second-class" medal in the Salon, an unprecedented honor for an American. The *Columbian Fountain* at the World's Fair, Chicago, designed and executed by him, added to his fame. Other notable works are a *Diana; Winged Victory,* at the West Point Military Academy; *Horse Tamer,* in Prospect Park, Brooklyn; and *Nathan Hale,* in the City Hall Park, New York.

**Macomb,** *Ma koom',* **Alexander** (1782-1841), an American soldier, born in Detroit, Mich. He entered the cavalry, was adjutant-general by the outbreak of the War of 1812, was transferred to the artillery and, having distinguished himself at Ft. Niagara and Ft. George, was promoted to the rank of brigadier-general, in command of the northern frontier. On Sept. 11, 1814, he fought the land Battle of Plattsburg, for which victory he was made major-general and was thanked and awarded a gold medal by Congress. Following the war he was colonel of engineers, and from 1828 until his death was commander-in-chief of the army.

**Macon,** *Ma' kon,* **Ga.,** an important railroad center and the county seat of Bibb Co., in the central part of the state, on the Ocmulgee River and on the Southern, the Central of Georgia, the Georgia, the Georgia Southern & Florida, the Macon & Birmingham, the Macon, Dublin & Savannah and other railroads. It is 90 m. s.e. of Atlanta and is the third city of Georgia in size. Macon lies in a fertile farming region noted for its cotton and fruits. The city has pleasing surroundings; the interurban roads and drives are well kept, and broaden, as they reach the city, into attractive paved boulevards, shaded residence streets and busy retail districts. The city has large fair grounds, pleasant parks, among which are Tatnall Square, Chickamauga Park and Daisy Park; just east of its limits are the interesting and historic Indian mounds. The public buildings include six orphan asylums, two public libraries, a Federal Building, an Academy of Music, armories, modern county buildings and a number of well-built churches.

Besides the public schools there are many higher educational institutions. Among these are: Mercer Academy (Baptist); St. Stanislaus College (Catholic); Mt. de Sales Academy, a Roman Catholic school for women; the Wesleyan Female College, Ballard Normal School, Central City College and the Georgia State Blind School. Peaches are among the most important fruits shipped; other exports are corn, cotton, lumber, live stock and vegetables. The great Georgia kaolin beds lie near Macon and are extensively worked in this vicinity. Textile mills, lumber mills, brickyards, foundries, machine shops and flour mills represent the industrial life of the city.

Macon was named in honor of Nathaniel Macon, an American statesman. It became a city in 1824, and during the Civil War was an important Confederate treasury depository. It was taken by the Federal troops near the close of the war. Population in 1910, 40,665.

**Macpherson,** *Mak fur' son,* **James** (1736-1796), a Scottish poet, born at Ruthven, Inverness-shire. He studied at King's College, Aberdeen, and became a schoolmaster. In 1760 he published a series of "translations" of Gaelic verse, under the title of *Fragments of Ancient Poetry Collected in the Highlands.* This book attracted so much attention at Edinburgh University that the faculty there

commissioned Macpherson to go to the field and make further collections. The poet did so, and in 1762 and 1763 published the two volumes, *Fingal, an Epic Poem, in Six Books,* and *Temora, an Epic Poem, in Eight Books.* These were alleged translations of the poems of Ossian, a legendary Gaelic bard and hero of the third century. Soon it was believed that much of the work was original with Macpherson, and not translated, and a long and heated controversy followed. It is now generally accepted that Macpherson added much of his own, but that the poems have a real basis in Gaelic legend.

**McPherson,** *Mak Fur' son,* **James Birdseye** (1828-1864), an American soldier, born in Sandusky, Ohio, and educated at West Point. He entered the engineering corps. At the opening of the Civil War he was aide to General Halleck, and as chief engineer of the Army of the Tennessee he rendered excellent service at Ft. Donelson, Shiloh, Corinth and Iuka Springs. As major-general of volunteers he so distinguished himself under Grant, in the Vicksburg campaign, as to be made brigadier-general in the regular army. Later he commanded the Army of the Tennessee, and he was efficient in Sherman's Atlanta campaign until killed in the attack upon Atlanta in July, 1864.

**MacVeagh,** *Mak Va',* **Franklin,** an American merchant, born in Chester County, Pa., and educated at Yale and at Columbia universities. He was admitted to the bar in 1864 and for two years practiced in New York; then he went to Chicago, where he established the firm of Franklin MacVeagh & Company, wholesale grocers, of which he was head until March, 1909. He was defeated as Democratic nominee for United States Senator in 1894, two years later became a Republican and in 1909 entered the Taft cabinet as secretary of the treasury.

**MacVeagh, Wayne** (1833- ), an American lawyer, brother to Franklin MacVeagh, born in Chester County, Pa., and educated at Yale. Admitted to the bar in 1856, he was prosecuting attorney, served in the Civil War, and in 1870 was appointed minister to Turkey. As head of the MacVeagh Commission, President Hayes sent him to adjust disputes in Louisiana in 1877; four years later he became attorney-general under President Garfield, from 1893 to 1897 he was ambassador to Italy and in 1903 he was chief counsel of the United States in the Venezuela arbitration before The Hague Tribunal.

**Mad"agas'car,** an island in the Indian Ocean, separated from the southeastern coast of Africa by Mozambique Channel. In size it is fifth among the islands of the world, being surpassed by Greenland, New Guinea, Borneo and Baffin Land. The greatest length is 980 m., the width 358 m., and the area is estimated at 228,500 sq. m., or two and one-half times that of Great Britain. The eastern and central parts of the island are mountainous, but to the west and south the land is low, and the principal rivers flow into Mozambique Channel. The largest rivers are the Betsiboka, Mangoka, Tsiribihina, Onilahy and Mangoro. The climate of the elevated regions of the island is temperate; that of the lowlands, tropical. There are two seasons, a wet and a dry, along the western coast. In the eastern part the rainfall is excessive and the climate is unhealthful.

The extensive tropical forests are in the east, and diminish in the western part to mere clumps of shrubs or trees on savannahlike plains. The representative species of trees are ebony, mahogany, palm, fir, coconut and ravenala. On the dry, southern plains are cacti and euphorbias. The center of the island is barren and dry. Among the plants grown for food are sweet potatoes, cassava, rice, manioc, groundnuts, yams and coffee. Tobacco, hemp, cotton and sugar cane are also cultivated. The manufactures consist of the weaving of cotton, silk and hemp fibers. The chief native industry is cattle breeding, nearly 3,000,000 cattle being bred. Since 1903, ostrich farming has occupied a fair per cent of the population. The trade is

mostly with France, and French influence on the island has given some stimulus to the cultivation of rice. A railroad has been completed between the east coast and Antananarivo, the capital. In 1902 a wagon road was also completed from the capital to the eastern coast. On this the mails, freight and passengers are carried chiefly by automobiles. Steamship service is maintained between Madagascar and Marseilles.

The natives of the island are known as the Malagasy. There are three principal tribes, the Hovas, the Betsimisarakas and the Sakalavas. Of these, the Hovas are a mixture of Indonesians and Malays, and are thought to have migrated hither eight centuries ago, as the last representatives of the Malay migration. They are the ruling tribe, and many of them are converts to Christianity. French and the Hova language are taught in the schools. There are about 750 primary schools, four normal schools, a school of medicine and an industrial and agricultural school.

Madagascar, referred to by Marco Polo, was probably confused with the African mainland during the 12th century, but in 1500 it was sighted by the Portuguese and named São Lourenço. The island was settled principally by the French, but a native tribe in the heart of the island prevented any progress by foreign powers. Madagascar has been alternately in the hands of the French and the English, and the strength of the natives has caused frequent checks to, and reactions from, European influences. Between 1883 and 1885 a contest for supremacy took place between the natives and the French, with the result that the island was placed under French protection. In 1896 it was made a colony of France. Population in 1905, 2,644,672.

**Mad'der,** a Mediterranean plant of the Madderwort Family. It is a perennial herb with tiny greenish flowers which are followed by small black berries. The root is fleshy, and from it is secured the coloring matter called dyers' madder, the source of the familiar "turkey red." In Holland one species is extensively cultivated, and particular attention has been paid to the manufacture of the dye. See DYEING.

**Madeira,** *Ma de' ra,* a river of Brazil and the largest tributary of the Amazon. It is formed by the juncture of several rivers of Bolivia, and flows northeast into the Amazon about 75 m. east of the city of Manaos. With the Mamoré, which is its chief branch, the river is 2000 m. long and is navigable for 1000 m. At San Antonio are the Falls of the Madeira, a series of beautiful cataracts which effectually interrupt navigation. The Madeira is subject to floods and receives its name from the timber (madeira) which at flood time is floated down its current.

**Madeira Islands,** a group of islands in the Atlantic Ocean, lying about 400 m. w. of the coast of Morocco. Madeira, the principal island, is 38 m. long, 12 m. wide and has an area of 300 sq. m. The other islets are Porto Santo and Deserta Grande. The main island has an even and healthful climate, and is known as a health resort. Its vegetation is abundant and many varieties of fruit are grown. The wine industry has made the island famous; about 700,000 gallons are exported annually. Funchal is the capital. The Madeiras belong to the Portuguese. The population, chiefly of mixed Portuguese, Moorish and negro blood, exceeds 150,500.

**Madero, Francisco Indalecio** (1873-1913), a Mexican political leader, born in Coahuila upon the estate of his grandfather, a wealthy landowner. In his early young manhood he assumed the care of the family estates and conducted affairs with such skill as to win the respect of his associates and neighbors and the good will of his employees. He introduced modern methods of mining and of agriculture, and by means of an excellent system of irrigation made possible the introduction of new crops into Mexico. In 1900 Madero came to the City of Mexico, where he became at once interested in political affairs and founded a political organization, branches of

which were soon known in almost every state of Mexico. In 1905 he opposed the Diaz administration openly and suffered many indignities through his zeal. In 1910 he issued his famous book *The Presidential Succession of 1910,* and became himself a candidate for president upon the Independent, or "Democratic," ticket. His suggested reforms included: a fair distribution of the land, which was chiefly in the hands of a few wealthy landowners; the restitution of the Indian lands; the liberation of political prisoners and prisoners of war; and free speech. Madero was arrested before the election, but escaped and by his stirring "Call to Arms" instituted a revolution which resulted in the final overthrow of the Diaz government.

He was elected president in October, 1911, and immediately set about the introduction of the promised reforms. Whatever his other mistakes, Madero showed great generosity to his enemies, and wisdom in the control of his divided people. In the revolution of 1912-13 Madero was arrested and was killed either accidentally or by design on Feb. 13, 1913. Because of the unsettled condition of the country a characterization of Madero's administration cannot yet be given. His sincerity and his evident desire for the welfare of his people cannot, however, be questioned.

**Mad'ison, James** (1751-1836), fourth president of the United States, born at Port Conway, Va. He was the son of James Madison, a man of English descent who early settled in Virginia. The son prepared for college under private tutors, and graduated from Princeton in 1771, remaining for another year to study Hebrew. His early studies were very painstaking. It is said that for minute and thorough knowledge of ancient and modern history and of constitutional law he was unequaled among Americans of the Revolutionary period.

In 1774 Madison was appointed a member of the Committee of Safety, and early in 1776 he was chosen a delegate to the Virginia convention that formed the state constitution. Here he advocated the incorporation of a provision assuring absolute religious liberty to all men. He was a member of the first Legislature under the new constitution, and from 1780 to 1783 he served in the Continental Congress. He was then again elected to the Virginia Legislature, where he strongly advocated a more effective national union of the colonies.

Madison was a delegate to the convention of states which met at Annapolis in 1786 to consider interstate commercial relations. This body, largely through Madison's efforts, proposed the general convention of states that met in Philadelphia the following year to form the present Constitution of the United States. In the Federal Convention thus called he was an influential member, presenting in the "Virginia Plan" the basis of some of the most important provisions of the Constitution. He rendered the further service of keeping a careful record of the proceedings of the convention, which is our main source of information concerning the deliberations of this important body. After the convention he joined with Hamilton in writing *The Federalist,* aimed at securing the ratification of the Constitution by the states, and was especially influential in its ratification by Virginia. His services were so great in this whole matter of the organization of a government with genuine national powers, that he has been called the "Father of the Constitution."

In 1789 Madison became a member of the first House of Representatives under the new Federal Constitution, serving throughout Washington's presidency. His influence was exerted to confine the powers of the general government to those granted by the Constitution. He therefore allied himself with the Anti-Federalist, or Republican-Democratic, Party. He retired from Congress in 1797 and reentered the Virginia Legislature. When Jefferson became president in 1801 he appointed Madison, who was his close personal friend, secretary of state, which position he held during both terms of Jefferson's administration. He was elected to succeed Jefferson in the

presidency in 1809, and was reelected for a second term beginning in 1813.

While president, Madison was forced into the War of 1812, which, being a man of peace, he was not entirely successful in conducting (See WAR OF 1812). After the expiration of his second term, he retired to Montpelier, his country home in Virginia, which for the next 20 years was the Mecca of public men, where Mrs. Madison, one of the most celebrated women ever mistress of the White House, dispensed gracious hospitality.

**Madison, Wis.,** a city, county seat of Dane Co. and capital of the state, 82 m. w. of Milwaukee and 120 m. n.w. of Chicago, between lakes Mendota and Monona, and on the Chicago & North Western, the Illinois Central and the Chicago, Milwaukee & St. Paul railroads. Madison is situated in an agricultural region and is an important commercial center for central and southwestern Wisconsin, having an extensive trade in farm, garden, dairy and tobacco products. The city has a picturesque situation in what is called the "Four Lakes Region." This region takes its name from Waubesa, Kegonsa, Mendota and Monona lakes, which are connected by the Yahara River. The streets are wide and beautifully shaded, with a profusion of elms and maples. Brittingham, Tenney, Vilas and Capitol parks are attractive, and along the shores of Lake Mendota there is a 12-mile boulevard and parkway. There are many handsome residences and the city and vicinity are noted summer resorts. The principal building is the state capitol, situated in a park at the summit of a hill near the center of the city. The old capitol building was destroyed by fire in 1904 and is being rebuilt of granite, on a magnificent scale, at a cost of over $6,000,000. Other public buildings include the Federal Building, city hall, courthouse, Fuller Opera House, banks and substantial business houses. There are about 22 churches.

Madison is a prominent center of higher education and the city is the seat of the University of Wisconsin (See WISCONSIN, UNIVERSITY OF). Connected with the university is the Washburn Observatory. The State Historical Library and Museum is housed in a handsome Ionic structure built at a cost of $700,000, and contains a valuable collection of historical mementoes and a reference library of about 240,000 volumes. This is considered one of the best historical libraries in the United States. The building also contains the libraries of the university and the Wisconsin Academy of Sciences, Arts and Letters. There are also the Carnegie, the Woodman Astronomical and the State Law libraries. Other educational institutions include the Wisconsin Academy, a nonsectarian preparatory school, a high school, public and parochial schools and the Academy of the Sacred Heart (Catholic), a boarding school for girls and several business schools. On the shores of Lake Monona lies Monona Park, owned by the city. The extensive experimental farm of the Wisconsin State College of Agriculture lies near the limits of the city. The state hospital for the insane is located at Mendota, a distance of about six miles from the city. Near the city, at Fitchburg, is one of the five fish hatcheries maintained by the state.

The manufacturing industries are represented by machine shops, stereotype and other foundries, agricultural-implement works, boot and shoe factories, machine shops, electrical-appliance works and flour mills. There are also several large printing establishments and a beet-sugar plant. In 1836 Wisconsin was organized as a territory by act of Congress, and the same year Madison was selected as the capital. The place was named in honor of James Madison. The first constitutional convention met here in 1846, and in 1856 a city charter was granted. Population in 1910, 25,531.

**Madon'na,** a term in use in all languages to denote the Virgin in art. It is from an Italian word meaning my lady. There are many Madonnas by various artists and about 50 are consid-

ered worthy of special mention by the greatest art critics. Each takes its name from some feature of the picture, as the *Madonna of the Chair,* which represents the Virgin seated and holding the infant Jesus in her arms; or from the place for which the painting was originally intended, as the *Sistine Madonna.* Raphael was the greatest painter of Madonnas. The most noted of these are *Madonna della Candelabra,* in London; *Madonna di Ansidei,* National Gallery, London; *Madonna of the Canopy,* in the Pitti Palace, Florence; *Madonna Belle Jardinière* (Pretty Gardener), in the Louvre; and the *Sistine Madonna,* now in the Dresden Gallery. The last is one of the Twelve Great Paintings of the world. It conveys the artist's idea of the Virgin as the Queen of Heaven. She is descending from the clouds and holds the child Jesus in her arms. On either side St. Barbara and St. Sixtus kneel in adoration, and below are two cherubs famous for their beauty. This picture was painted for an altarpiece for the Church of San Sisto at Piacenza, from which it takes its name. It was finished a short time before Raphael's death. See RAPHAEL SANZIO.

The greatest German Madonna is the *Madonna of Burgomaster Meyer,* by Holbein. The *Madonna with St. Anne,* by Leonardo da Vinci, and the *Madonna of the Rosary,* by Domenichino, are also widely known.

**Madras',** a seaport on the eastern coast of India, capital of the Presidency of Madras, situated on the Bay of Bengal. The educational institutions of Madras include the Presidency College, the government school of arts, six missionary colleges, a law college, a medical college and a school of engineering. Among other buildings are the Scottish Church of St. Andrews, the St. George's Cathedral, several Mohammedan and Hindu temples, the government house and the Chepauk Palace. The harbor is not commodious in itself, but several improvements have been effected. Only within recent years have the industries become numerous and important. They consist of clothing, earthenware, soap, flour, machinery and canned fish. Madras was founded in 1640, at which time Francis Day, the head of the East India settlement at Armagon, received a grant of the present site of the city from one of the native princes. Population in 1906, 522,972.

**Madras, Province of.** See INDIA.

**Madrid',** the capital of Spain, and of the Province of Madrid in New Castile, situated on the left bank of Manzanares River, on a high plateau of sand and clay that is treeless and barren. The climate is variable, but its severe extremes of heat and cold are relieved by an unusual clearness and dryness of the atmosphere. The business center of the city is in the plaza, the La Puerta del Sol, where are found the chief public buildings and where the street railways of the city terminate. The streets of new Madrid are broad and clean; the old part contains irregular houses of antiquated architecture. The magnificent boulevard running north and south the entire length of the city is one of the finest promenades in the world.

Among the buildings are the royal palace, the National Library and Museum, the government buildings, the city hall, the Royal Exchange, the Bank of Spain, the University of Madrid, with over 5000 students, the National Library, the National Museum with a collection of masterpieces by Raphael, Titian, Rubens, Tintoretto, Velásquez and Van Dyck, which makes it one of the most valuable picture galleries in the world; and several important theaters, the Teatro de la Comedia being the most popular. The bull ring, or Plaza de Toros, is of Moorish architecture, and built in magnificent style with a seating capacity of over 13,000 spectators. The libraries and museums are numerous and valuable, and Madrid is the educational center of Spain, being the seat of the Spanish Academy and the Geographical, Historical and Anthropological societies.

Since 1890 Madrid has seen an extraordinary industrial development. The manufactures include leather goods,

jewelry, fans, umbrellas, musical instruments, chemicals, pottery, drinks of all kinds, soap and perfumes. Its commercial importance is still more significant. In the tenth century Madrid was occupied by the Saracens; Philip II made it his capital in 1560. Population in 1900, 539,835.

**Maelstrom,** *Male' strom.* See WHIRLPOOL.

**Maeterlinck,** *Mah' ter link,* **Maurice** (1862- ), a Belgian-French dramatist and poet, born in Ghent, Belgium. He studied at the Collège Sainte-Barbe and at the university of his native town, and was admitted to the bar in 1887. In 1896 he removed to Paris and devoted all his time to literature. All his work is touched with mysticism, becoming a revelation of the mysteries that are closely related to ordinary life. At times his characters are mere phantoms moving in an unreal world; a spiritual life is revealed, however, lacking in neither intensity nor tragedy. In 1911 he was awarded the Nobel prize for literature. His works include *The Intruder, The Blind, Seven Princesses, Monna Vanna, Pelléas et Mélisande, Joyzelle* and *The Blue Bird.* Among his essays are *Wisdom and Destiny, The Treasure of the Humble* and *Life of the Bee.*

**Mafia,** *Mah' fe ah,* a secret order among Italians. It probably originated in Sicily, where its members are most numerous. The chief object of the organization is to protect its members from the law for any crimes they may commit. Silence, secrecy and absolute obedience to the commands of the leader of the band are among the chief requirements of members. The order has been the cause of many murders in all countries where Italians are found, and in 1890 it caused serious trouble in the United States, when the chief of police in New Orleans was supposedly murdered by a member of the organization. The Italian Government has not been able to suppress the Mafia.

**Magazine,** *Mag" a zeen',* a storehouse, in military usage a storehouse for ammunition. The *expense magazine* is that from which the troops draw the ammunition needed for each day. It is located conveniently, at a safe distance, and may be built underground or in the defenses, protected by bombproofs. In war vessels the magazines are located deep below the water line and as far as possible from the engines, and every precaution is taken to keep them cool, and safe from everything combustible.

**Magazine.** See NEWSPAPER.

**Mag"dale'na Bay,** a large bay indenting the western coast of the South District of Lower California. At its mouth lies the Island of Santa Margarita, and it is protected from the ocean by a low sand bar. The bay itself is among the finest harbors of the Pacific and has a length of nearly 50 m. The town of Magdalena is located at the head of the harbor. In 1912 it was rumored that the Japanese were to purchase land bordering on Magdalena Bay. Since the purchase would be a violation of the Monroe Doctrine, it was strenuously opposed by the United States. See MONROE DOCTRINE.

**Magdalena River,** the principal river of Colombia, rising near the Ecuador boundary and flowing north to the Caribbean Sea. Steamers ascend the river for 600 m. to Honda, where there are rapids. A railroad has been built about these and navigation continues on the upper river to the city of Neiva. The principal tributaries are the Cauca and the Sogamoso. Its total course is 950 m. The Magdalena forms the chief means of communication between the interior of Colombia and the sea.

**Magdeburg,** *Mahg' de boork,* the capital of the Province of Saxony, in Prussia, situated on the left bank of the Elbe River, 88 m. by rail s.w. of Berlin. It is a modern fortress and the citadel is situated on one of the islands of the Elbe; the remaining fortifications consist of detached forts and redoubts. The principal buildings of the city are the magnificent Gothic Cathedral of SS. Maurice and Catharine, Church of Our Lady, the Rathaus, the exchange, the Reichsbank and the old royal palace.

The manufactures are represented by the large beet-sugar works (the most extensive in Germany), machine works, including the famous Gruson and Krupp works at Buckau, distilleries, chemical works, etc. Magdeburg was first known to history in the ninth century. In 937 Otto the Great erected a monastery there and in 968 it was made the seat of an archbishop. It accepted the Reformation in 1524 and played a prominent part in that movement. It was besieged during the Thirty Years' War by both Wallenstein and Tilly, suffering heavy losses. Population, about 230,000.

**Magellan,** *Ma jel' an,* **Ferdinand** ( ?-1521), a famous explorer, and discoverer of the strait that bears his name. He was born in Portugal. In 1517 he offered his services to the King of Spain to find a westward passage to the Spice Islands, and in 1519 set sail from Seville with a fleet of five vessels. In February, 1520, he reached the entrance to the Rio de la Plata, and in October of that year arrived at the strait that bears his name. Sailing through the strait, he entered the Pacific Ocean and reached the Philippines in March, 1521. Here he was killed, Apr. 27, in a conflict with the natives. One of his vessels, however, made the journey back to Spain, and for this reason Magellan is honored as the first circumnavigator of the globe.

**Magellan, Strait of,** a passage connecting the Atlantic and Pacific and separating the Continent of South America from the Island of Tierra del Fuego. It is 370 m. long and varies in breadth from 2½ m. to 70 m. Enclosing a number of small islands and subjected to squalls in stormy weather, navigation of its waters is often unsafe. Punta Arenas is the only harbor of importance. The strait is of great convenience to steamers and constantly used. It was discovered by Magellan in 1520.

**Maggiore,** *Mahd jo' ra,* **Lake,** or **Lago,** *Lah' go,* **Maggiore,** a lake partly in northern Switzerland and partly in the Swiss Canton of Ticino. It is 37 m. long, from 2 to 6 m. wide and has an area of 82 sq. m. It is 636 ft. above the sea and has a greatest depth of 1221 ft. Only the eastern bank is lowland and descends to the plains of Lombardy; the other sides are lined with mountain ranges containing lofty snow-capped peaks. There are many small towns along its shores, which are popular winter resorts for foreigners because of their picturesque location and favorable climate. Steamers at frequent intervals connect the principal points on the lake, and a railroad skirts its eastern shore.

**Magi,** *Ma' ji,* among the Medes and Persians, a caste of hereditary priests who managed the sacred rites, guarded and propagated the sacred traditions and practiced divination and astrology. Exercising great public and private influence, they educated the princes of the realm and were companions to the monarchs. The reforms of their founder, Zoroaster, enforced on them a simpler and more abstemious life than they had previously led. The name *magi* came gradually to be applied to any holy man or sage in the East. According to tradition, the Magi who came to see the infant Savior were named Melchior, Balthasar and Gaspar, and their bones supposedly rest in the Cathedral of Cologne. In art, one of the three is represented with a swarthy complexion.

**Magician,** *Ma jish' an,* one who through superior knowledge and skill is able to perform, or give the impression of performing, deeds which, to those less sophisticated, appear to require magical or supernatural powers and perhaps even the assistance of departed spirits. Among savages the native magician is often considered a sorcerer. He may be the priest and possibly the chief of the tribe. The magicians of ancient Egypt, Babylonia, Assyria, Greece and Rome hold an important place in the history of those civilizations. Incantations and sacrifices were systematically employed; and curiously wrought amulets and talismans, often engraved with magical inscriptions, were prepared with much ceremony and worn in profusion. The term is now frequently applied to one who is skillful in sleight-of-hand performances.

**Magic Lantern.** See STEREOP'TICON.

**Magna Charta,** *Mag' na Kar' ta,* or **Great Charter,** a document embodying the ancient privileges of the barons and of the people of England. It consists of a preamble and 63 clauses, chiefly relating to abuses of the times. Its primary aim was the protection of the feudal proprietor against the abuse of royal power, but its greatest value lay in its preservation of the idea of legal contract between the king and his subjects, and in the consequent growth of Parliamentary power. Among the provisions of the Charter are clauses defining and limiting feudal rights, establishing fixed law courts, and requiring trial for a noble by his peers. There was to be no extraordinary tax without the consent of those taxed, no arbitrary banishment or imprisonment, and no denial, sale or delay of justice. One standard of weights and measures was established, and the Church of England was declared free.

The Charter was granted by King John of England in 1215, in response to a demand made by a confederation of the barons. John was entrapped at Runnymede, near Windsor, and was there forced to sign and seal the document. The Magna Charta has been called by Hallam "the key stone of English liberty."

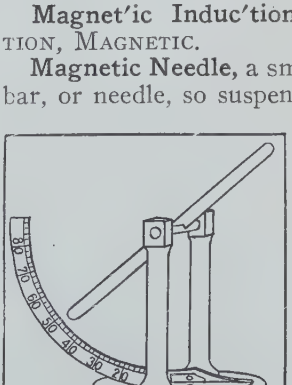
**Magnesia,** *Mag ne' zhi a,* or **Magnesium Oxide,** the product of the burning of magnesium in the air. It is a white, tasteless substance and is of value medicinally as a mild cathartic. It is used in the manufacture of crucibles and is a basis of many cleaning powders.

**Magnesium,** *Mag ne' zhi um,* a well-known element occurring so widely as dolomite that entire mountains are formed from it. With other elements it occurs as soapstone, meerschaum, hornblende, asbestos, serpentine and clay. It is also found in sea and mineral waters and in some plants and animals. Magnesium is a tin-white metal, quite ductile at high temperature, and it oxidizes sufficently to become covered with a thin, bluish coat of its oxide. On account of the brilliant light with which it burns, it is used in signal lights, fireworks and "flash-light" powders in photography. Its oxide, a white powder generally known as magnesia, has such a high melting point that it is used in making electric furnaces and fire bricks. Magnesium sulphates found in the spring waters at Epsom are called Epsom salts and are used medicinally.

**Mag'net,** a body having the power to attract iron, steel, cobalt and nickel. Natural magnets are found in the form of an ore known as magnetite, or loadstone. This is an ore of iron possessing naturally strong magnetic properties. An artificial magnet is a bar of iron or steel which has been magnetized. Artificial magnets are named, according to the shape, bar magnets or horseshoe magnets. The latter, when not being used, generally have a bar of soft iron, called an armature or keeper, placed across the ends. The magnetic force is seen to be stronger near the ends of a magnet, which are therefore spoken of as the poles. An electromagnet is a magnet which is maintained by passing an electric current through coils of insulated wire wound about a piece of iron or steel. See MAGNETISM; ELECTROMAGNET.

**Magnet'ic Induc'tion.** See INDUCTION, MAGNETIC.

**Magnetic Needle,** a small magnetized bar, or needle, so suspended or hung on a pivot that it can swing freely in a horizontal plane. Its final position is practically north and south, and if moved from this position it tends to return to it. The end of the needle which points north is called the north, or north-seeking, pole; the other, the south pole. The north pole is also frequently spoken of as the marked end. In most localities the mag-



DIPPING NEEDLE

netic needle does not point truly north and south; the angle between the direction the needle does point, called the magnetic meridian, and the true meridian, is called the magnetic declination at that place. In the Central States the needle points east of north, the declination varying from 4° to 12°. Its chief practical use is in the surveyor's compass and in the mariner's compass. In determining the direction of true north from either instrument, the observer must know the magnetic declination for the locality where he is.

Dipping Needle, a magnetic needle so suspended that it swings freely in a vertical plane. It is used in studying the magnetism of the earth at different localities. North of the equator the north pole of the needle dips downward, while south of the equator the south pole dips. At the magnetic equator the needle remains level and at each of the magnetic poles it stands vertical. Unless the vertical plane in which the needle is free to swing is placed in the magnetic meridian, that is, north and south according to the magnetic compass, the angle of depression, or dip, will not be correct. A graduated scale is arranged in such a manner that the dip may be easily read in degrees of angle. The angle of dip, also called the angle of inclination, varies in the Central States from 60° to 75°. See Compass, Magnetic.

**Mag'netism,** that property of matter whereby certain substances, especially soft iron and steel, tend to attract or repel each other. The name comes from Magnesia in Thessaly, the place where natural magnets were first found. Pieces of the ore, variously called magnesian stone and loadstone, or lodestone, were found not only to attract each other but to have the peculiar property, if suspended so as to swing freely, of pointing north and south. This advantage, eagerly made use of by mariners, led to its being called leading stone. A piece of steel or iron, if rubbed with a natural magnet, was found to assume the same properties and thus became an artificial magnet. Magnetic force always acts in paths that form closed circuits, and the field in which all these lines of force lie is called the magnetic field; thus a magnet in the form of a closed ring does not attract other objects because the circuit made by the lines of force is completely closed. If, however, the ring be broken and the halves separated, the lines of force will pass across the open space. A magnetic substance placed across the opening forms an easier path for the lines of force than does the air, and thus is strongly attracted. When the magnet is a straight bar, the lines of force pass through the air in widening curves. This is easily shown by holding a magnet under a card upon which iron filings have been sprinkled; if the paper is jarred so that the filings are drawn into the magnetic paths, a visible magnetic field is made.

Because one extremity of the bar magnet when freely suspended always points toward the north and, even if swung halfway around, always returns to its original position, the north-pointing end of the magnet is called the north-seeking, or the north, pole, and the other the south-seeking, or the south, pole. If the north pole of one magnet is brought near to the north pole of another, the two are strongly repelled, but if the north pole of one is brought to the south pole of another the two are strongly attracted. No matter into how many pieces a magnet may be broken, each piece has its north and its south pole.

Technically, a magnetic pole is said to be of unit strength if it will repel a like pole placed at a distance of one centimeter from it in air, with a force of one dyne. A magnetic field is said to be of unit strength if it will exert a force of one dyne on a unit pole placed in it; in common practice, such a field is said to have one line of force per square centimeter, the square centimeter being taken perpendicular to the direction of the field. Hence field strengths are stated in terms of lines of force per square centimeter; a field having a strength of five units is said to have five lines of force per square centimeter.

Magnetism is an important factor which plays a useful part in the arts and sciences. Acting through the compass, it directs navigation and guides travelers in unexplored territory. It is an important factor in producing electricity in the dynamo (See DYNAMO), and in transforming the electrical power into mechanical power in the motor. It is of great value in lifting heavy iron and steel bars, in raising steel plates whose shapes render them not easily fastened by cables, and in holding drilling machines to steel plates while holes are being drilled for purposes of construction. In surgery, magnetism aids in removing pieces of steel from the eye or from other parts of the body; in autos, traction cars, etc., it works the brakes; and along railway lines it operates the signals.

Terrestrial magnetism refers to the earth as a magnet; its poles, which vary in position, lie, one in the Northern and the other in the Southern Hemisphere, but not at the geographical poles. At the north magnetic pole a bar magnet would stand vertically with its north pole pointing toward the earth; at the south pole the reverse would be true. See ELECTROMAGNETISM; MAGNETO; MAGNET.

**Mag'netite,** or **Magnetic Iron Ore,** a valuable ore of iron, which contains 72 per cent of that mineral and a large proportion of oxygen. It has a metallic or submetallic luster, is black in color, brittle and hard. The distinguishing quality of magnetite is its strongly magnetic property; another quality is the occasional presence of magnetic polarity, in which case it is called loadstone and constitutes a natural magnet. The ore is found in great abundance in Sweden, Canada and the northern and eastern parts of the United States. Magnetite is almost universally present as a constituent of igneous, sedimentary and metamorphic rocks, occurring sometimes massive, sometimes in granular form; and it is often found with an intermixture of sand, from which it can be separated with profit by washing the sand in sluices containing riffles, through which water is flowing rapidly.

**Mag'neto,** or **Magneto-Electric Machine,** a small dynamo or electric generator whose fields are produced wholly or in part by permanent steel magnets. Magnetos are widely used in ignition systems for gas and gasoline engines; the current generated by the magneto is caused to jump a small gap and thus make a spark that ignites the gas and air mixture in the cylinder of the engine. A few machines are made with a commutator and auxiliary field windings and are thus essentially small direct-current dynamos, though the current is not very uniform but somewhat pulsating in character. Such machines may be used in connection with storage batteries for lighting automobiles, and with a mechanical interrupter for exciting the spark coil of the ignition system.

For ignition purposes the commercial magneto usually has two auxiliary features built in with it; an arrangement revolving with the armature shaft for automatically breaking the armature circuit usually two times during each revolution; and another arrangement geared to the armature shaft for automatically connecting the high-potential circuit to the spark plug of each engine cylinder in turn. In all such cases it is, of course, necessary that the armature of the magneto be connected to the shaft of the engine by suitable gears or otherwise, so that it will always give its sparks at the proper times for the explosion of the gas-air mixtures in the successive cylinders of the engine. See TRANSFORMER; INDUCTION COIL; DYNAMO.

**Magno'lia,** a large, pyramidal-topped tree of the Magnolia Family, of which 20 species are known in eastern North America, southern Mexico and southeastern Asia. The most common American magnolia grows from 60 to 80 ft. in height and has scaly, gray or light brown bark, small, spreading branches, marked by prominent leaf scars, and many leathery, shining green leaves. The large, showy flowers appear after the leaves, and have three spreading sepals and

from 6 to 12 large white petals. The fruit is a scarlet cone whose seeds when ripe hang by long, delicate threads. All parts of the tree have a bitter taste and a somewhat aromatic odor; the bark and dried flower-buds are used medicinally.

The species of magnolia found in the United States are variously called mountain magnolia, sweet bay and cucumber tree. The magnolia is the state flower of Mississippi, Louisiana and Georgia. See CUCUMBER TREE.

**Mag'pie,** a bird of the Crow Family. It is from 17 to 21 inches in length, of which the tail occupies 10 to 12 inches. The color is black, with bronze iridescence, white under parts and white wing patches. The nest is built in willows, thorn bushes, mulberry bushes, etc., and is made of large sticks, lined with mud, grass, hair and pine needles. It contains seven brown-spotted eggs. The magpie inhabits Europe and northern Asia, as well as parts of North America, where it is known as the blue-billed magpie. Being extremely sociable, magpies often gather in flocks of considerable size. They make interesting pets, being taught to talk to a limited extent, but are very inquisitive and are too mischievous to be allowed much freedom.

**Magruder,** *Ma groo' der,* **John Bankhead** (1810-1871), an American soldier, born in Winchester, Va., and educated at West Point. He served in the war against Mexico, and at the outbreak of the Civil War joined the Confederates, commanding in the defense of Richmond as brigadier and as major-general. Late in 1862 he commanded in Texas, New Mexico and Arizona, and he was in charge of an expedition against Galveston. Following the war, he served with the imperial army in Mexico until the downfall of Maximilian.

**Mahan', Alfred Thayer** (1840-1914), an American naval officer and writer, born at West Point, N. Y. After graduating from the United States Naval Academy, he entered the navy and remained in the service over 40 years, being retired in 1896 at his own request. He took an active part in the Civil War. From 1886 to 1889 and again from 1892 to 1893 he was president of the Naval War College, and during the Spanish-American War he was a member of the naval board of strategy. In 1899 he was a delegate to the Peace Conference at The Hague. Admiral Mahan's long experience and powers of observation, together with his study of naval affairs, made him one of the most eminent naval authorities of his time. He was the author of a number of works upon naval affairs, the most important of which is *The Influence of Sea Power Upon History, 1660-1783,* a work that was practically epoch-making in its influence. Among his other works are the *Life of Nelson, the Embodiment of the Sea Power of Great Britain* and *Lessons of the War with Spain.* Honorary degrees have been conferred upon Admiral Mahan by the universities of Cambridge, England; McGill, Montreal; and Harvard, Yale, Columbia and Dartmouth in the United States.

**Mah"anoy' City, Pa.,** a city of Schuylkill Co., 13 m. n.e. of Pottsville and 55 m. n.e. of Harrisburg, on the Mahanoy Creek, in a valley bounded on the southeast by Broad Mountain, and on the Philadelphia & Reading and the Lehigh Valley railroads. Its prosperity is derived from anthracite mines, but it has foundries, potteries and flour, lumber and hosiery mills, etc. The borough has a public library and public and parish schools. It was settled in 1859 and incorporated in 1863. Population in 1910, 15,936.

**Mahog'any,** a valuable tree of the Mahogany Family, found chiefly in the tropics. The trees are noted for their dark, heavy wood, which has long been prized as the finest furniture wood. The leaves are evergreen and made up of many small leaflets; the flowers and fruit are small and inconspicuous. The tree which produces the best wood grows slowly and becomes mature only after 200 years. Imported mahogany comes chiefly from Mexico and the West Indies. A Florida mahogany produces a timber used for the interior decoration

of cars and houses, and from the same tree a bitter drug, employed as a substitute for quinine, is made.

**Mahom'et.** See MOHAM'MED.

**Maid'enhair",** a beautiful woodland member of the Fern Family uncommon enough to be fully appreciated. Its stems are stiff and slender, almost wirelike, but of a lustrous brown color, and have given the plant its name. The stem branches at a height of eight or ten inches from the ground, and these branches bear tiny wedgelike, green leaflets and are set off by the darker shadings of the stems. These ferns are found over scattered localities, often growing in great quantities but sometimes represented by a single plant. Their haunts are shady or rocky woodlands where the soil is moist and the air cool.

**Maid of Orleans,** *Or' le anz.* See JOAN OF ARC.

**Maine,** *Mane,* THE PINE TREE STATE, the most northeasterly state of the Union and one of the New England states, is bounded on the n. and e. by New Brunswick, on the s. by the Atlantic Ocean and on the w. by New Hampshire and the Province of Quebec.

SIZE. The greatest length is 303 m., the greatest breadth is 212 m. and the area is 33,040 sq. m., of which 3145 sq. m. are water. Maine is a little larger than South Carolina, a little smaller than Indiana, and it lacks only 344 sq. m. of being as large as all the other New England States combined. It is the 38th state in size.

POPULATION. In 1910 the population was 742,371. Between 1900 and 1910 there was a gain of 47,905 in the population, or 6.9 per cent. There are 24.8 inhabitants to the square mile and the state's rank in population is 34.

SURFACE. In general the surface is rolling upland, on which rise clusters of mountains and isolated peaks, through which are cut numerous river valleys. The highest peak is Mt. Katahdin, 5273 ft., situated a little north of the central part of the state. Other prominent peaks, most of which are in Franklin County, are Saddleback Mountain, 4000 ft., Mt. Abraham, 3388 ft., Mt. Bigelow, 3600 ft., and Mt. Blue, 3200 ft. A divide extending in an east and west direction across the state, a little north of these mountain peaks, separates it into north and south slopes. At the western boundary this divide has an elevation of about 2000 ft., but at the eastern boundary it is only 600 ft. high. North of this divide the surface slopes gently toward the northeast, and with the exception of hills and mountains near the southern border and in the central part it contains no highlands. As a whole this region is poorly drained and marshy.

The region south of the divide contains nearly all the mountains, is more hilly and in general descends to the south with a more rapid slope, the fall being greatest in the west. The shore line is unusually irregular, as shown by comparing the shore measurement with the distance from Eastport to Portland, in a straight line. Thus measured, this distance is about 200 m., while the length of the coast line between these points is nearly 2500 m. Along the coast are many drowned valleys, which form excellent harbors, and off the coast are numerous islands belonging to the state. Of these Mt. Desert Island is most widely known.

RIVERS AND LAKES. Most of the region north of the divide is drained by the St. John, whose principal tributary is the Aroostook. South of the divide are the St. Croix, forming a part of the eastern boundary; the Penobscot, the Kennebeck, the Androscoggin and the Saco.

Maine has about 1600 lakes. The largest, Moosehead Lake, is situated north and west of the center. It has an area of 500 sq. m. and is the largest lake wholly within New England. Chesuncook Lake, Rangeley Lakes and Sebago Lake are the others most prominent.

SCENERY. The pine forests and clear lakes with their wooded shores, the isolated mountain peaks piercing the clear sky, and the numerous streams combine with the undulating surface of the uplands to form charming and beautiful

scenery, which makes the state attractive both to visitors and to the permanent inhabitants.

Climate. The most northern boundary is 47° 30′ north latitude, and that portion of the state north of the divide has long and severe winters, lasting from five to seven months. South of the divide the winters are shorter and less severe. The summers are cool and salubrious. The growing season in the south is limited to about five months, and in the north it is even shorter. As shown by records kept at the state university for 42 years, the mean temperature for January is 16.5° and for July, 67.2°. There is abundant rainfall and most of the state is subject to heavy snows. The salubrious summer climate; extensive forests in which game is still plentiful; beautiful lakes containing fish; deep woods, the haunts of moose and bear; and the numerous islands along the coast affording excellent camping facilities,—all make Maine one of the most attractive states for summer tourists, and it claims to have a larger number of summer tourists than any other state in the Union.

Minerals and Mining. There are numerous outcroppings of granite along the coast and farther inland. Quarries are worked in a number of localities where the rock can readily be shipped by water. Some of the most extensive quarries are located at Hallowell, Dix Island, Vinalhaven and Freeport. The stone is of excellent quality and is used for building purposes. Marble is found in the southwestern part of the state, and slate of good quality occurs in the central part. Some mica is also quarried. Lime is quarried in large quantities at Rockland and Rockport. Brick, tile and other clay products are manufactured in increasingly large quantities. Valuable deposits of tourmalines and other precious stones are found at Mt. Mica in the town of Paris, at Mt. Apatite in Auburn, and in other localities.

Forests and Lumber. In the colonial period the entire state was covered with forests, in which white pine predominated, but the southern part of the state has been cleared and converted into farms. The central and northern parts are still forested. Throughout the state trees grow with remarkable rapidity, and it is claimed that deforestation is impossible except by extensive fires.

Although lumbering is not so extensive as formerly, it is still one of the leading industries. Large quantities of spruce are cut for the manufacture of wood pulp and for timber. In the central part of the state are forests of white birch, which is used in the manufacture of spools.

Agriculture. The farms of Maine, like those of the other New England States, are small and are tilled by their owners. Diversified farming is generally practiced and a variety of crops is raised.

*Soil.* The strongest and most fertile soil is found in the river valleys, but that on the uplands produces good crops.

*Products.* The chief farm crops are hay, potatoes, oats, buckwheat, rye, corn, barley and wheat. Maine produces the finest sweet corn in the world, and large quantities are raised for canning. The canned corn is shipped to other parts of the country. Apples and small fruits are grown in paying quantities. Raising horses and cattle for market, and dairy husbandry are also important branches of agriculture. Dairy products amount to about $13,000,000 a year.

Fisheries. The fisheries of Maine rank second only to those of Massachusetts among the New England States. The lakes and streams are well stocked with trout, bass, pickerel and salmon. From the coast waters cod, herring, haddock, menhaden and other fish are taken in large quantities. One species of herring is canned in large quantities and marketed as sardines. Lobster and clam fishing is also important. The fisheries give employment to about 17,000 persons and the catch in 1910 was valued at $5,864,000.

Manufactures. The water power within the state is almost beyond estimate, and it has been a valuable aid in

developing manufactures. Long before Maine became a state, shipbuilding was an important industry, but after the advent of steel ships this declined. The chief industries are the manufacture of leather, of cotton and woolen goods, of flour and gristmill products, of lumber and its allied products, of wood pulp and paper and of machinery, and the canning of fish and vegetables.

Transportation and Commerce. The numerous harbors along the coast and the estuaries of the Kennebec and Penobscot, both of which are navigable for about 60 m., afford excellent water communication. Lines of steamships run from Boston to Portland, and to cities on the Kennebec River, Penobscot Bay and River, Mt. Desert Island and to Eastport. The Boston & Maine, the Grand Trunk, the Canadian Pacific, the Maine Central and the Bangor & Aroostook railroad systems have lines extending throughout the state in various directions and connecting with the great trunk lines of New England and the West. Portland is the chief railroad center. Numerous electric lines connect towns and cities in the densely populated portions of the state.

Paper, wood pulp, lumber and lumber products, cotton and woolen goods, agricultural products, canned goods, fish, granite, lime and slate are exported. Raw material for manufacturing, foodstuffs and manufactured goods are imported.

Government. Maine has but one constitution, which was adopted in 1819. The governor is the only state officer elected by popular vote. There is no lieutenant-governor, but the governor is assisted by a council of seven members elected by the Legislature. The treasurer, attorney-general and commissioner of agriculture are elected by the Legislature. The terms of all state officers are for two years.

The Legislature consists of a Senate of 31 members and a House of Representatives of 151 members. All members are elected for two years and sessions are held biennially. All appointments made by the governor must be confirmed by the council. The president of the Senate succeeds to the governorship in case of vacancy. In 1908 an amendment to the Constitution providing for the initiative and referendum was adopted.

The judicial department consists of a Supreme Court with a chief justice and seven associate justices, appointed by the governor for seven years. Sessions of this court presided over by a single justice are held in each county. Cumberland and Kennebec counties have each a Superior Court presided over by a resident judge. Each county has a Probate Court and in most of the counties municipal courts have been established. Trial justices, in the various towns, have jurisdiction over local cases of minor importance.

Education. A superintendent of education appointed by the governor and confirmed by the council for three years is at the head of the school system. The township or city is the unit for local administration. Revenue is derived from a state school fund and local taxation. Textbooks, apparatus and supplies are free. Attendance between seven and fifteen years is compulsory. State normal schools are maintained at Castine, Farmington, Gorham, Presque Isle and Machias. The University of Maine at Orono is at the head of the educational system. Other institutions not under control of the state are Bowdoin College at Brunswick; Bates College at Lewiston; Colby College at Waterville; and Maine Wesleyan Seminary and Woman's College at Kent's Hill.

State Institutions. The hospitals for the insane are at Augusta and Bangor. There is a military and naval orphans' asylum at Bath. There is a United States soldiers' home at Togus. The Maine General Hospital and the United States Marine Hospital are at Portland. The Central Maine General Hospital is at Lewiston and the Eastern Maine General Hospital is at Bangor. The state prison is at Thomaston. The state school for boys is at South Portland and the industrial school for girls at Hallowell.

CITIES. The chief cities are Augusta, the capital; Auburn, Bangor, Bath, Biddeford, Lewiston, Rockland, Portland, Waterville and Westbrook. Old Orchard Beach and Bar Harbor are noted summer resorts.

HISTORY. Maine was probably visited by Norsemen as early as 996. Verrazano explored it in 1524, as did Hawkins in 1565, Gilbert in 1583, Gosnold in 1602 and John Smith in 1614. The first English settlement, at Sabins Point on the Kennebec, established in 1607 by Popham, was abandoned on account of the climate. Tracts in Maine being given to Gorges, Mason and other promoters, settlements were soon made at York, Pemaquid, Saco and other coast points. Most of these were destroyed by Indians. In 1677 Massachusetts purchased the Gorges' rights and in 1691 Maine was consolidated into "The Royal Province of Massachusetts Bay," to which it belonged until it entered the Union as a free state, 1820, to balance the admission of Missouri (See MISSOURI COMPROMISE). The Webster-Ashburton Treaty of 1842 settled the boundary dispute between Maine and New Brunswick. Since 1850 a heavy penalty has been placed on the manufacture or selling of intoxicants. The state furnished over 70,000 men during the Civil War.

GOVERNORS. William King, 1820; William Durkee Williamson, 1821; Benjamin Ames, 1821; Albion Keith Parris, 1822; Enoch Lincoln, 1827; Nathan Cutler, 1829; Jonathan G. Hunton, 1830; Samuel Emerson Smith, 1831; Robert Pinckney Dunlap, 1834; Edward Kent, 1838; John Fairfield, 1839; Edward Kent, 1841; John Fairfield, 1842; Edward Kavanagh, 1843; Hugh J. Anderson, 1844; John Winchester Dana, 1847; John Hubbard, 1850; William George Crosby, 1853; Anson Peaslee Morrill, 1855; Samuel Wells, 1856; Hannibal Hamlin, 1857; Joseph H. Williams, 1857; Lot Myrick Morrill, 1858; Israel Washburn, 1861; Abner Coburn, 1863; Samuel Cony, 1864; Joshua Lawrence Chamberlain, 1867; Sidney Perham, 1871; Nelson Dingley, 1874; Selden Connor, 1876; Alonzo Garcelon, 1879; Daniel F. Davis, 1880; Harris Merrill Plaisted, 1881; Frederick Robie, 1883; Joseph R. Bodwell, 1887; Sebastian S. Marble, 1887; Edwin C. Burleigh, 1889; Henry B. Cleaves, 1893; Llewellyn Powers, 1897; John Fremont Hill, 1901; William T. Cobb, 1905; Bert M. Fernald, 1909; Frederick W. Plaisted, 1911-1913; William T. Haines, 1913—. Previous to its admission into the Union, Maine was governed as a province of Massachusetts.

**Maine, The,** a United States battleship. Late in January, 1898, under Captain Sigsbee, it sailed to Havana, to all appearances on a visit, but in reality to safeguard American interests. A pilot of the Spanish Government led the *Maine* to anchorage; but on the night of Feb. 15, it was destroyed by a mysterious explosion, 266 of the crew perishing. The Sampson board of inquiry declared that the ship had been "destroyed by explosion of a submarine mine, which caused the partial explosion of two or more of her forward magazines." The cry "Remember the *Maine*" intensified the war spirit against Spain. The *Maine* lay in Havana Harbor, a menace to shipping, until the winter of 1912, when the hulk was raised, and by a remarkable feat of marine science, was made to float. Escorted by American warships, bearing the flag and decked with roses, it was towed into the Florida Straits, where it was sunk. With impressive ceremonies, the recovered remains of 34 victims of the disaster were buried in Arlington cemetery, Washington. The mainmast of the *Maine* was placed over their graves in memorial. Other intact features of the battleship were sent to various cemeteries and historical museums.

**Maine, University of,** at Orono (1865). This institution was first chartered as the State College of Agriculture and Mechanic Arts and was opened in 1868. In 1897 it took its present name. It comprises colleges of arts and sciences, agriculture, technology, pharmacy and law. The Maine Agricultural Experiment Station is a department of

the university. The law school is located at Bangor. Military instruction is required by law. The university is coeducational. The library contains over 45,000 volumes and the enrollment is about 900.

**Mair, Charles** (1840- ), a Canadian poet, born in Ontario and educated at Queen's University. He early contributed prose and poetry to the press, and was a correspondent, at Ft. Garry, to the Montreal *Gazette,* for which he wrote a series of brilliant papers called *Canada in the Far West.* Conspicuous among his publications are *Tecumseh, a Drama,* the finest poetical drama in Canadian literature; *The Last Bison* and *Through the Mackenzie Basin.*

**Majolica,** *Ma jol' i ka,* a clay product or earthenware beautifully decorated in colors and with a lustrous, metallic enamel. The first examples came from the Island of Majorca (in Italian *Majolica*) in about the 15th century. Plates, bowls, vases, pitchers, bottles and flasks are the usual forms in which majolica products are made. See ENAMEL; POTTERY.

**Ma'jor,** a military officer ranking next below lieutenant-colonel and next above captain. The major has command of a battalion of infantry, field artillery, or engineers, or a squadron of cavalry. Each regiment of United States infantry and cavalry has three majors, one to each battalion or squadron. Members of staff in various departments and in the United States marine corps are frequently majors.

**Major, Charles** (1856-1913), an American novelist and lawyer, born in Indianapolis, Ind. He graduated at the University of Michigan in 1875, was admitted to the bar in 1877 and engaged in practicing law in Shelbyville, Ind. In 1885-6 he was a member of the Indiana Legislature. His historical novel of the days of Henry VIII, *When Knighthood Was in Flower,* published in 1898, became at once popular, and was very successfully dramatized. It was followed by *Dorothy Vernon of Haddon Hall, A Forest Hearth, A Gentle Knight of Old Brandenburg, The Little King* and *The Touchstone of Fortune.*

**Major'ca,** an island in the Mediterranean, a possession of Spain and the largest of the Balearic Isles. It is about 58 m. long and has an area of 1352 sq. m. Only the southern coast is low and contains a good harbor; the other shores are steep and rockbound. The fertile southern part of the island contains long stretches of vineyards; hemp, cereals, flax and various kinds of fruit are also grown. The coast fisheries are valuable, but the industrious Catalans are engaged chiefly in agricultural pursuits. Palma, the capital, is located on the southern coast. Population, nearly 250,000.

**Malacca,** *Ma lak' a.* See MALAY PENINSULA.

**Malacca, Strait of,** a body of water connecting the Bay of Bengal with the South China Sea and separating the Island of Sumatra from the Malay Peninsula. There are numerous islands in its southeastern part, on one of which is located Singapore, the British settlement. The strait is 500 m. long and has a maximum width of 250 m. in the northwestern extremity.

**Malachi,** *Mal' a ki,* the last book of the Old Testament; also the name of the reputed author of the book. As Malachi signifies "my messenger," some commentators consider that it is used in the opening verse in a literal sense and that the book is anonymous. *Malachi* consists of two divisions: (a) a general presentation of the main theme, followed by a rebuke to the priests; (b) a rebuke to the people for their unlawful marriages with the Gentiles, and exhortations to repentance. The book was written during the Persian period, in the fourth century B. C. See BIBLE, subhead *The Old Testament.*

**Malachite,** *Mal' a kite,* a native basic carbonate of copper, commonly occurring massive, though sometimes fibrous and in the form of icicles. It is usually partially transparent, bright green in color, takes a high polish and has a bright luster. The massive variety is valuable for gems and for table tops, clock cases,

inlay work and similar ornamental purposes. Fibrous malachite, when finely ground and mixed with proper ingredients, serves as paint. A fine quality of malachite is found in the Ural Mountains and in Arizona, and Montana, and the mineral also occurs in France and Russia.

**Málaga,** *Mah' lah gah,* a seaport of southern Spain, capital of the province of the same name, situated on the Mediterranean coast. Several Moorish ruins remain, in the midst of handsome, modern buildings. The chief industrial establishments are iron foundries, cotton mills, engineering works, tanneries and manufactories of sugar, soap, candles and paper. The climate is mild and the view from the sea suggests the beauty of Naples. Population in 1900, 130,109.

**Mala'ria,** a term sometimes applied to effluvia of marshes and swampy lands arising from decomposition of animal or vegetable matter; but more often to the unhealthy condition of the body, caused by this poison and manifested by chills and fevers. Until recent times the disease was believed to be the result of inhaling the miasmic air of such regions; but in 1880 a French army surgeon, named Laveran, discovered the microscopic parasite in the blood, which subsequent investigation proved to be the malaria bacillus. The germ is commonly carried by certain species of mosquito, but may also enter the system through drinking water contaminated with the germs. The disease sometimes does not manifest itself until 12 months after exposure, and often leaves a depressing influence which lasts through life. The chills and fever are intermittent and regular, occurring from one to four days apart. A certain amount of immunity may be acquired by the use of quinine. From five to ten grains may be taken once or twice a week or every morning before breakfast. See MOSQUITO.

**Malay' Archipelago, Indian Archipelago** or **Malaysia,** *Ma la' shi a,* a group of islands lying southeast of Asia and separating the Indian Ocean on the west from the Pacific on the east. This great archipelago, the most extensive on the globe, includes such well-known islands as Borneo, Sumatra, Java, Celebes and New Guinea, and such groups as the Philippines, the Moluccas and the Sundas, besides a long chain of lesser islands. Politically the islands belong to different nations. By far the greater number are under the dominion of Netherlands; the Philippines belong to the United States; Penang, Singapore, Labuan and a part of Borneo and of New Guinea belong to Great Britain, while several of the smaller islands are Portuguese. The inhabitants of the islands are of two races, the Malay and the Papuan, the latter being the inferior race. Their homes are bamboo structures built partly over the water; their chief pursuits are trading in fruits and constructing boats.

**Malay' Peninsula,** or **Malacca,** *Ma lak' a,* a long, narrow peninsula of southeastern Asia extending for about 850 m. toward Sumatra. Its width varies from 50 to 210 m. and its area is 90,000 sq. m. Two parallel mountain ranges extend lengthwise through the peninsula and are covered with immense forests of valuable trees, such as sandalwood, teak, camphor, cinnamon, palms, ebony, rattan, etc. Wild animals and birds of brilliant plumage make their homes in the wooded slopes. Metals are also abundant in the mountains, and over one-half of the world's supply of tin is obtained here. Gold, silver, iron and coal are also mined. Upon the fertile plains at each side of the mountain ranges, rice, pepper, cotton, sugar cane, areca nuts, tobacco, coffee, tea, tapioca, cocoa and yams are cultivated. The peninsula is also noted for its export of gums. The inhabitants are of different races, being chiefly Malays, Siamese, Negritos and Chinese; in numbers there are from one to two million people. Politically the peninsula is partly British and partly Siamese.

**Malden, Mass.,** a city of Middlesex Co., 5 m. n. of Boston, of which city it is a suburb, on the Malden River and

on the Boston & Maine and other railroads. Interurban lines connect with Boston, Haverhill, Salem, Lynn, Lowell and other towns and cities. A number of villages are included within the corporate limits of the town. A fine system of parks is maintained, Pine Banks being the best known. The Middlesex Fells, a state reservation, lies to the north and west of Malden. Among the public buildings are a city hospital, home for aged persons, public library, endowed by Elisha S. Converse, and a day nursery. Malden has important manufacturing interests, the most valuable manufactured products being rubber boots and shoes, sand and emery paper, lasts, glue, cords and tassels, boot-trees, wire cord, knit goods, furniture, picture moldings, cotton goods, soap, cordage, carpets and paper. Malden was settled in 1641 and was a part of Charlestown until 1649. A city charter was granted in 1881. Population in 1910, 44,404.

**Mal'dive Islands,** a group of many small coral islands of the Indian Ocean, lying between 200 and 300 m. s.w. of India. They are arranged in 17 groups all protected by barrier reefs. Fishing is an important pursuit, and on the larger islands, where the soil is fertile, fruits, millet, coir and coconuts are raised. The islands are ruled by a native sultan, but they are British possessions and form a part of the Ceylon Government. The inhabitants are chiefly Mohammedans and number about 50,000.

**Malice,** *Mal' is,* in law, an intention to injure the person or property of another. It is usually termed *malice aforethought.* When the act consists in doing damage to public or private property out of a spirit of wanton cruelty or revenge, it is termed *malicious mischief* and the perpetrator is liable to severe punishment. Malicious intent is presupposed in the commission of the act, and the burden of proving the contrary rests with the accused.

**Mal'lard,** a bird of the Duck and Goose Family, and the best known of the American game birds. Its iridescent-green head and neck, chestnut-brown chest with white collar, gray sides and under parts, black rump and tail coverts, and changeable green, black-bordered wing feathers easily distinguish the handsome male. The female is mottled with buff and dark gray, a plumage well suited to render her inconspicuous while incubating the six to ten pale greenish eggs, laid in a grass-made, down-lined nest, hidden on the ground. In the fall these ducks feed on wild rice, as well as seed and grain, and become very fat, offering a tempting target for the sportsman. The mallard breeds from the southern part of the United States to Alaska, and winters in Panama.

**Mal"leabil'ity,** that property of matter by virtue of which it is capable of being hammered or rolled into thin sheets. Metals are the only substances that are malleable to any extent, the most malleable being, in order, gold, silver, copper, platinum, iron, aluminum, tin, zinc and lead. See GOLD BEATING.

**Mal'lory, Stephen Russell** (1813-1873), secretary of the Confederate navy, born at Trinidad, in the West Indies. He was appointed inspector of customs at Key West in 1832, was admitted to the bar in 1839, served in the Seminole wars in Florida and became United States senator in 1851. He held this position until 1861, when he became secretary of the navy for the Southern Confederacy. After the war he resumed his law practice.

**Mal'low,** herbs and shrubs of the Mallow Family, best known through their common representative, the round-leaved mallow of fields and roadsides. This mallow is a low herb, which was brought from Arabia to be used in the preparation of ointments. In the United States it has escaped from gardens and, though not especially troublesome, is called a weed. The stems are bent along the ground, and often extend for several feet from the parent root, which is deep and tough. The leaves are kidney-shaped, with rounding lobes and wavy margins. The flowers are white, lined with rose or pink, and the five petals are blunt-pointed and spreading. In the cen-

ter stands an erect tube, from which the stamens protrude. The fruit is flat and circular, marked by radiating lines, which show that it is formed from many united pods, which when ripe fall away separately. These fruits are the "cheeses" sought for by the children and eaten with delight, though they are practically tasteless. All of the mallows contain mucilaginous substance and when young are thickly covered with soft, downy hairs.

Some of the other well-known mallows are: the three-lobed mallow, a European

MALLOW

mallow with large, white or rose-colored flowers, cultivated as a garden plant; the marsh mallow, an Eastern plant, somewhat coarser than the above, from the root of which mucilage and marsh mallow paste are made; the tree mallow, a woody plant which grows from two to six feet in height and has pale purple flowers; and the rose mallow, a favorite ornamental shrub.

**Mal'ory, Sir Thomas,** an English author, living during the 15th century. Little is known of his life. He compiled the Arthurian romances (it is uncertain from what source), and in his translations added charm and dignity to the stories through his manly, earnest style, and the moral strength with which he has imbued them. Tennyson made use of Malory's *Morte d' Arthur* for his *Idylls of the King*. See TENNYSON, ALFRED.

**Malta,** *Mol' ta,* an island in the Mediterranean Sea, lying between Tripoli and Sicily. It is a British possession and is a part of the Maltese group including Comino, Gozo and other islands. A mild and healthful climate prevails except when the *sirocco,* a hot desert wind, blows from the Sahara. The fertile soil yields two or three yearly crops and the principal products are honey, figs, oranges, cotton, olives, potatoes and corn. Lace, cotton goods, lucifer matches and filigree are manufactured. The educational facilities are good. Malta has long been used as a port of call, and Valetta, the capital, has one of the best harbors in the world. Population in 1901, including the garrison and navy, 207,890.

**Mal'thus, Thomas Robert** (1766-1834), an English economist, educated at Cambridge University. In 1798 he published his *Essay on the Principle of Population as It Affects the Future Improvement of Society,* the main idea of this work being that population tends to outgrow means of sustenance. From 1807 until his death he served as professor of political economy at the East India Company's College at Haileybury. The doctrine of Malthus as stated in his essay has had tremendous influence on economic thought, and suggested to Darwin the influence of the struggle for existence upon progress.

**Malting.** See BREWING.

**Mal'vern Hill, Battle of,** an engagement of the Civil War, fought in Virginia, at Malvern Hill, near the James River, July 1, 1862. Eighty thousand Federals of the Army of the Potomac, under McClellan, had a very strong position on the hill and had the further advantage of support from gunboats on the river. Though Lee had an equal army, the bayonet charge which he had ordered all along his line failed, and

when the battle ceased, after dark, not a line or column of the Federals had been broken, while each Confederate advance had been forced back and every battery had been disabled. The Confederates lost over 5000 men; the Federals less than one-third as many. This was the last of the "Seven Days' Battles," ending the Peninsula Campaign, and Lee withdrew to Richmond.

**Mamma'lia,** the highest group of animals and a member of the Vertebrate division, which also includes birds, reptiles, frogs and fishes. The Mammals differ from the other groups by three chief characteristics: the young are nourished by a sweetened milk secreted by the mother's glands; the body is more or less coated with hair, a protective covering assumed by no other group of animals; and all are warm-blooded. Mammals are by far the most important of the animals, for not only does the class include man but it also embraces those animals which assist him in his labors, and furnish his bedding and clothing, much of his food and even his domestic pets. They are distributed over all parts of the earth and comprise 14 principal families. The chief groups are: the Primates, a class including man and the monkeys; the Insectivora, or insect-eating animals; the Carnivora, or flesh-eating; the Ungulata, or hoofed; the Rodentia, or gnawers; and the Marsupialia, or pouched. All of these are treated under their respective titles, and an outline of the entire group may be found in the article Zoology, subhead *Classification.*

**Mam'moth,** a recently extinct elephant closely related to the existing Asiatic elephant. It lived in the temperate parts of the Northern Hemisphere during the glacial period, moving northward with the receding ice and surviving until some time after the appearance of man. An abundance of mammoth fossils have been found in the regions bordering on the North Sea and in northern Asia, where they have been incased in the ice thousands of years. Toward the close of the 18th century an entire carcass, which had been frozen into an ice cliff on the north coast of Siberia, was discovered in a state of such perfect preservation that the flesh served as food for animals. Other remains have been found from which several specimens have been reconstructed for natural history museums. The reconstructed figure closely resembles that of the elephant of the present time. The tusks of the mammoth were more curved than those of the elephant, and the body was covered with a dense coat of reddish fur interspersed with straight, black hairs. The average size was little above that of the elephant, though gigantic specimens have been found. A pair of tusks discovered in Alaska measure 12¾ ft. in length. One of the largest mammoth specimens is owned by the Field Museum of Natural History, Chicago.

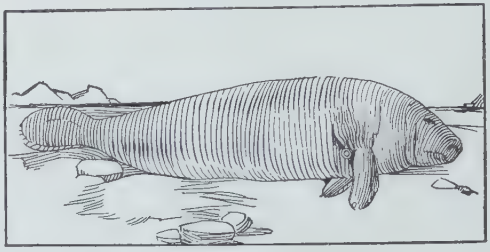
**Mammoth Cave,** the largest-known cavern in the world, situated in Edmonson County, Ky. The cave, discovered by a hunter in 1809, consists of numerous limestone caverns, which have been explored for several miles. The largest chamber, called the Chief City, is 450 ft. long and 130 ft. wide. Other large chambers are the Mammoth, Gorin's and the Stella, all with dome-shaped roofs and each about 250 ft. in height; the Lucy Dome is 300 ft. high. In all the passages beautiful stalactites and stalagmites occur in fantastic forms resembling natural objects and architectural designs; while lakes, rivers, waterfalls and fountains enhance the beauty of the subterranean scenery. By the use of artificial lights enchanting effects are produced in certain parts, as in the Star Chamber, which, when illuminated, appears to be studded with innumerable points of light. The cavern contains several streams, the largest of which is Echo River, which is nearly a mile in length and which flows into Green River. Another river, the Styx, is spanned at one point by a natural bridge of singular beauty. Numerous blind fish, blind grasshoppers and other insects are found in the cave. The Mammoth Cave is one of a series of limestone caverns under-

lying about 8000 sq. m. of territory in Tennessee and Kentucky. Their formation is due to the disintegrating effects of water.

**Man,** the most highly developed member of the animal kingdom. There have been many different views concerning man's place in the animal kingdom, but leading authorities now agree in placing him in the order Primates, which also includes apes and monkeys. Man differs from the ape, however, in the following particulars: 1. The spinal column has a double curve, which enables him to maintain an erect position. 2. Man uses his arms only for holding objects, whereas the ape uses them for locomotion. 3. The skull is more nearly balanced on the line of the spinal cord, and the forward projection of the nose and chin common in apes is lacking in man. 4. Man has a relatively larger brain than any other member of the animal kingdom. 5. In intelligence man so far exceeds all other beings on earth as to place him in a class by himself.

There have been many theories concerning the origin of man. Darwin and his school believe man to have been developed from the monkey and ape through a long period of evolution. Others believe that both man and the ape descended from a common ancestor of which no trace now remains, and still others believe him to be a distinct creation. See ANTHROPOLOGY; ETHNOLOGY.

**Man"atee',** or **Sea Cow,** a family of lake and ocean Mammals somewhat resembling seals and whales in habit. There are few species and comparatively few representatives of each class. All have rounding heads, nearly hairless bodies and flattened, paddlelike or forked tails. The hind limbs have entirely disappeared and the forelimbs have webbed coverings which, in the species also known as the manatee, have nails at their extremities. This particular species has a divided upper lip which aids in the mastication of its food, and many teeth which continue to increase in number throughout the animal's life. The manatee was once common along the coasts of Florida and the Gulf States but has been rendered scarce because its flesh and oil are highly valued. A separate species is found in the Orinoco River. See DUGONG.



MANATEE

**Man'chester,** a city, civic county, municipal and Parliamentary borough of Lancashire, England, situated on the Irwell River, 31 m. n.e. of Liverpool and 189 m. n.w. of London. The city lies on a level plain, and the residences are principally of brick made from clay, dug out of the fields on which the houses have been built. Terra cotta is used more and more for the large warehouses, many of which possess distinct architectural merit.

The buildings embrace the Cathedral, or Old Church, the Church of the Holy Name, St. John's Catholic Cathedral, the Cavendish Independent Church, the Royal Institution, or art gallery, the Royal Infirmary, the Royal Exchange, the Gothic Town Hall, the Free Trade Hall, the Assize Courts, the Athenæum, the Victoria University, Chetham's Hospital and an art gallery. The Town Hall is among the largest municipal buildings in the country and is distinguished for its Gothic architecture, its magnificent organ and its tower overlooking the vicinity as far as the hills of Derbyshire and containing the famous peal of bells. The educational facilities are good and the libraries are numerous. The parks number 39 and cover 1103 acres. Several bathing establishments have been opened. The city owns and leases a large number of tenements and cares for the housing conditions of the working classes.

Cotton spinning, weaving and manufacturing are the chief industries, and

after the introduction of machinery at the end of the 18th century the industrial development was extraordinary. Among other gigantic manufactures are woolens, silks, chemicals, machinery and miscellaneous articles of almost every variety. The Manchester Ship Canal, completed in 1894 at an expense of $75,000,000, affords direct communication with the sea and entrance to the very heart of the city and of the largest steamers. See CANAL.

There are evidences that Manchester was once occupied by the Romans, but nothing is definitely known until the Anglo-Saxon Period. The Danes invaded it in the tenth century. By the 14th century it was a thriving town, and its recent commercial and industrial growth has been very rapid. It became the headquarters of the free-trade movement after 1832, and to it the Manchester School of Economy owes its name. Population in 1905, 631,185; including Salford, 862,699.

**Manchester, Conn.,** a town of Hartford Co., 9 m. e. of Hartford, on the Hockanum River and on the New York, New Haven & Hartford Railroad. The villages of Highland Park, South Manchester, Buckland, Manchester Green and Manchester are comprised within the corporate limits of the town. The chief industrial establishments include paper, silk, cotton and woolen mills, gingham and stockinet factories, needle works and electrical-supply and soap works. A large amount of tinware is made here. There are public libraries in the villages of South Manchester and Manchester. Until 1823, when the town was incorporated as Manchester, it formed a part of East Hartford. Population in 1910, 13,641.

**Manchester, N. H.,** the largest city of the state and one of the county seats of Hillsboro Co., 17 m. s. of Concord, the state capital, and 53 m. n. of Boston, on the Merrimac River at the mouth of the Piscataquog, on five branches of the Boston & Maine Railroad and on interurban electric lines. It occupies the well-drained slopes of both river banks. The Amoskeag Falls in the Merrimac above the city provide extensive water power.

The city is attractively laid out, with broad, well-lighted and shaded streets, and has numerous well-kept public parks. One of them has a monument to Gen. John Stark, who resided here. Manchester contains a government building, a state industrial school, the Gale Home for Aged Women, St. Joseph's and St. Patrick's orphanages, St. Anselm's College, the Elliot, Sacred Heart, Notre Dame and Lady of Lourdes hospitals, and a fine public library. The Institute of Arts and Sciences provides classes and lecture courses in science, music and art. The most extensive industry is the manufacture of cotton goods, which is conducted on a vast scale. Other manufactures include boots and shoes, cigars, woolen and knit goods, wagons, carriages, hosiery, paper, leather, locomotives, machinery, needles, knitting machines, wooden goods and seamless bags. Manchester ranks fifth among the cities of the United States in cotton manufacturing and also fifth in the manufacture of boots and shoes. The water supply, the schools, and the fire and police departments, street-railway and electrical service are of the best.

Amoskeag Falls and vicinity formed a favorite resort of the Pennacook Indians, and it is said that John Eliot, the "apostle to the Indians," preached to them here in 1651. The first white settlement was made by Scotch-Irish immigrants, a few years previous to 1722, when a charter was obtained. In 1751 the territory known as Tyng's Township, or Harrytown, was incorporated as a township. In 1810 the name was changed to Manchester, the name being suggested by the manufacturing possibilities of the place. During the years from 1794 to 1807 a canal was built around the Amoskeag Falls through which to carry lumber. The villages of Amoskeag and Piscataquog were annexed in 1853. Manchester received a city charter in 1846. Population in 1910, 70,063.

**Manchester Canal,** a canal in England, 35.5 m. in length, through which ocean-going ships can pass from Liverpool to Manchester. More than 100 acres of docks, 6 m. of wharfage and 30 m. of railroad sidings have been constructed along the canal for the accommodation of foreign commerce. This is a lock canal considerably wider than the Suez Canal and two-thirds as long as the one at Panama. It is 120 ft. wide and 26 ft. deep, and cost approximately $75,000,000, one-third of which was paid by the city of Manchester. It was opened for traffic on Jan. 1, 1894, and formally opened on May 21 of the same year by Queen Victoria.

**Manchuria,** *Man choo' ri a,* a dependency of China lying between Siberia and Korea and bordering upon Mongolia on the west. Its northern boundary is outlined by the Amur and Argun rivers, while the Yalu separates it from Korea upon the south. In general, the country is mountainous and there are large forests of pine, oak, elm and walnut. Gold and coal are mined in increasing quantities. In the northern part are the steppe regions, and the most of the cereals of China are raised here; millet, wheat, barley, rice, corn, beans, peas, potatoes, tobacco, rhubarb, ginseng, cotton and hemp are among the most valued crops. Fur-bearing animals abound in the mountains where the climate is severe in the winter.

Manchuria has an area of about 360,000 sq. m. The inhabitants are chiefly Chinese. From the middle of the 17th century up to the formation of the republic a Manchu dynasty ruled China, and their language was the language of court. At present Manchuria is governed by a governor-general appointed by the Chinese Government. His official residence is at Mukden. The population of Manchuria based upon the Chinese household census is 16,000,000.

**Man'dalay,** a city of India, the former capital of Burma, situated on the Irrawaddy River, 350 m. n. of Rangoon. The streets are well lighted and are shaded by handsome avenues of trees. Among the buildings are various monasteries, pagodas, the government house, the hall of justice and the palace. There are some 20 bazaars containing a miscellany of collected wares. Silk weaving is the important industry. Population in 1901, 183,816.

**Man'dan,** a tribe of Indians, formerly living in what is now North Dakota. They constructed circular dwellings with dome-shaped roofs, which they made by stretching buffalo skins over a framework of poles. They were noted for their bravery and clean habits of life. The Mandans were decimated by smallpox and finally driven from their country by the Sioux. Only a few remain and they are on a reservation.

**Man'darin Duck,** a bird of the Duck and Goose Family, related to the wood duck of America. It is about 20 inches in length. The male is very brilliant; the upper parts are chestnut, with metallic lines of green, blue, purple and orange. The sides are marked by wavelike stripes of buff and white, and there are broad white and black bars on the shoulders. The breast is white; the head is green, buff and violet, with metallic reflections; and a heavy, chestnut crest projects from the back of the head. The female is very plainly marked. The mandarin duck is a native of China and Japan. In China it is considered remarkable as an example of conjugal affection, and a pair is often confined in a gaily decorated cage and carried at the head of a marriage procession. The mandarin duck has been carried to many parts of the world, and may now be seen in almost any zoological garden or aviary.

**Man'deville, The Travels of Sir John,** the title of a famous collection of marvels and adventures, composed in the latter part of the 14th century. The author in the book states that he is one John Mandeville, born at St. Albans, who in 1322 traveled through Tartary, Persia, Armenia, Africa, Chaldea, Ethiopia, Amazonia and India. He adds that the book was first written in Latin, then turned into French and English. These statements are no longer accepted as

true. It is probable that the French version (1371) is the oldest, and that from this one the others were derived, early in the 15th century. The work is mainly a compilation from the travels of various other itineraries, though the writer may have traveled in the East. This writer is supposed to be one John of Burgoyne with the Beard, who died at Liege in 1372. There are three English versions of the work extant.

**Man'dolin,** a musical instrument of the string type. It has a shell-shaped body made of thin pieces of wood glued together, a finger board and neck resembling those of a guitar, and a sounding board. The best mandolins have eight strings. The instrument is played by striking the strings with a small piece of tortoise shell or celluloid. It cannot sustain a long note, so is played as a tremolo.

**Man'drake,** a noticeable plant of the Barberry Family, which grows in moist

MANDRAKE

woodlands and often strays into meadows, where it attracts attention because of its large, flat leaves, which seem to make a raised floor from 12 to 20 inches above the ground. These leaves, of which there are but two, are light green, with a paler spot where the stem joins the leaf. The flowers are single, drooping blossoms, growing in the fork of the stem. They have creamy-white, separate petals and many yellow stamens surrounding a fleshy pistil. The flowers have a heavy odor, which becomes unpleasant as the flower grows older. The fruit is a large lemon-shaped berry having many seeds and a sweet, insipid taste.

The plant has many names given from its fruit and leaves; wild lemon, May apple, duck's foot and umbrella plant. The root, which is thickened and horizontal, is used in medicine but is an active poison in its natural state.

**Man'drill,** a baboon of the African forests, noted for its peculiar coloring. The body and limbs are covered with gray or brownish hair, but the nose is naked and swollen at the sides, where it is marked with lines and ridges of blue, black, pink or purple. The hinder portion, which is tailless and callous, also presents the same striking coloration, although red predominates. These gaudy colors are a matter of great pride to the mandrill, and it loves to admire its charms in a mirror. The limbs of the mandrill are long and stout, and it generally travels on all fours, although its favorite attitude is a resting position upon its haunches, with its "arms" across its knees and a bored expression upon its face. See BABOON.

**Man"ganese,'** a metal, widely distributed in nature and occurring as an ore in various parts of the United States and in Brazil and Russia. It is present in some mineral waters and food plants, and is a constituent of the atmosphere of the sun, occurring always in combination with other elements. It forms numerous oxides, important among which is manganese dioxide, or peroxide, a black powder used largely in the manufacture of chlorine, in making glass and black enamel for pottery and in the preparation of oxygen. Potassium permanganate, a compound of manganese, oxygen and potassium, is a strong oxygenizing agent, and for this reason is valuable in the useful arts and in chemistry and medicine. The metal is obtained by reducing any of its oxides with carbon or by heating manganese

chloride with metallic sodium. Pure manganese is gray in color, hard and brittle, with a reddish luster, and takes a high polish. It resembles iron, both physically and chemically, but is not magnetic. The metal is of no use by itself, but is valuable as an alloy of iron, copper, aluminum and mercury. As an alloy of iron it goes by the names *spiegeleisen* and *ferromanganese,* and is used extensively in the manufacture of steel. The manganese of commerce is commonly a mixture of its dioxides, not the metal itself.

**Mange,** *Manje,* a contagious skin disease of cattle, dogs or other domestic animals, caused by a small tick that burrows beneath the skin. The irritation causes the animal great suffering and produces a scabby skin. Animals infested should be bathed or dipped frequently in carbolic-acid solutions or treated with tobacco and sulphur sprays. Farmers having infected animals should take great care that the disease is not allowed to spread.

**Man'go,** a tropical tree, botanically related to poison sumac, and, with it, belonging to the Cashew Family. It is a tall, handsome tree with a large trunk which divides about 10 ft. from the ground and spreads in long branches to a length of 40 to 50 ft. These branches are thickly covered with long, leathery, evergreen leaves, which form a dense shade. The wood is soft and is employed in canoe building and light construction work. The flowers appear in long, thick clusters at the end of the branch, and are small pink or yellow blossoms.

The fruit, for which the mango is perhaps chiefly known, is a smooth, melon-shaped stone fruit, resembling the plum and containing one long, flat seed. In the better varieties it is juicy and sweet, but in the poorer kinds is dry and fibrous and has a decided taste of turpentine. The unripe fruit is used in making preserves, jellies and pies, much relished by the inhabitants of southeastern Asia, where the tree is native. The seed, in times of scanty crops of grain, has been used as a food. The mango was introduced into the East Indies late in the 18th century and has been grown with some success in southern and in western United States. It is not, however, a wholly popular fruit, except in the improved form known as the mangosteen.

**Man'grove,** a tropical tree of the Mangrove Family, peculiar from its manner of growth. The stems and branches have the power of sending out roots which extend down to the mud of the swampy shores upon which the tree grows, thus forming a close thicket. The globular seeds germinate while still on the tree and send out long, paddlelike shoots, which finally break the seeds from the parent stem; the seed end is the heavier, and, in falling, is buried deeply in the mud, leaving the half-grown stem emerging from the ooze and well begun in its growth. The leaves are large and leathery, the fruit is sweet and agreeable to the taste, and the wood is useful in boat building. Mangroves grow abundantly in southern Florida and on the Florida Keys.

**Manhat'tan Island.** See NEW YORK, CITY OF.

**Manil'a,** the chief city and the capital of the Philippine Islands, situated on the west shore of the Island of Luzon, at the head of Manila Bay and the mouth of the Pasig River. The old city, or walled city, is on the south side of the river. It is surrounded on two sides with a wall, which is encircled with a moat that in time of war can be filled with water from the sea. This part of the city is distinctly Spanish in its architecture and general appearance. The Cathedral, the government building and other prominent public buildings are located in this part of the city. On the opposite side of the river is Binondo, the modern city, which is the center of the commercial and industrial activity. Throughout the city the streets are straight and lighted by electricity. A few of them are paved and the others are macadamized. San Miguel, on an island in the river, is the fashionable

suburb. The river is crossed by several bridges. There are several public squares, and the Luneta is a favorite promenade. In the Plaza de Magallanes is an obelisk to the memory of Magellan.

Making cigars and cheroots is the leading manufacturing industry. Other important industries include the manufacture of products of Manila hemp, textiles and machinery and castings. Manila is on an excellent harbor and is the chief commercial center for the Philippines. It carries on a large trade with Great Britain, China and the United States. The chief exports are sugar, hemp, tobacco and cigars, coffee and dye goods.

The educational and charitable institutions include the University of the Philippines, established in 1911, St. Thomas University, a normal school, an athenæum, an observatory and several hospitals. Public education is in charge of the government, and the schools are patterned after those in the United States. The population is about 220,000, more than one-half of whom are Filipinos. There are about 21,000 Chinese and approximately 5000 Americans.

**Manila,** or **Abaca,** *Ah" bah kah',* a large herblike plant of the Banana Family, cultivated in the Philippines for its valuable fiber, used in making cordage and sailcloth. The stem, which is covered by the overlapping sheaths of the stemless leaves, is straight and grows to a height of from 8 to 20 ft. The plant reaches maturity in three to five years and is cut down when the first flower bud appears. The fiber is separated from the pulp of the leaves by machinery, then is washed, dried and bleached. On account of its hardness and strength Manila fiber is used in making binding twine, hawsers and cables.

**Manila Bay. Battle of,** the first notable battle of the Spanish-American War, fought in Manila Bay, in the Philippine Islands, May 1, 1898. Commodore George Dewey commanded an American fleet of nine vessels; the Spanish fleet consisted of ten vessels and was, besides, largely supported by shore batteries. Having been ordered from Chinese waters, the American fleet sailed past the Spanish cannon at the mouth of Manila Bay, on the night of Apr. 30, and early the following morning made a terrific attack on the Spanish fleet in the harbor, which by one o'clock was totally destroyed. Moreover, the batteries were silenced. Six Americans were wounded; the Spaniards lost over 600 killed or wounded.

**Man, Isle of,** an island in the Irish Sea, deriving its name from the fact that it lies almost equidistant from England and Ireland. Its length is 32 m., its width, 12 m. and its area, 220 sq. m. The surface is undulating, and a mountain chain extending the length of the island culminates in Snaefell, at a height of 2034 ft. above sea level. There are rich mineral deposits, principally of lead, iron, copper and zinc. The climate is remarkably even and the range of temperature throughout the year is very limited. Fishing is an important industry, and cattle and sheep range the pastures. The inhabitants, the Manx, are of Celtic origin, and their native, or Manx, language is a dialect of the Celtic. Between the sixth and the ninth centuries the island was ruled by Welsh kings. Later, the Norwegians and Danes held possession; in 1290 the Manx voluntarily placed themselves under the protection of the English, and near the end of the 18th century the British Government purchased the sovereignty of the island. Population, about 55,000.

**Man"istee', Mich.,** a city and the county seat of Manistee Co., about 114 m. n.w. of Grand Rapids, on the Manistee River, which flows between Manistee Lake and Lake Michigan and which here broadens out into a small lake. Transportation facilities are supplied by the Pere Marquette, the Manistee & Northwestern, the Manistee & Luther, the Manistee & Grand Rapids and other railroads, and by steamboat lines connecting with Chicago, Milwaukee and other lake ports. The town is one of

the most important shipping ports on Lake Michigan. The principal industries are the manufacture of salt and of lumber. Underlying the town is one of the largest deposits of rock salt in the world. There are also manufactories of shingles, furniture and sole leather. Manistee has a county normal school, a school for the deaf and dumb, a business college and a Carnegie library building, and owns and maintains Orchard Beach, a beautiful bathing resort about two and one-half miles distant. At Filer City, a few miles southeast of Manistee, are the largest salt works in the world. The first permanent settlement of Manistee was made in 1841; the town was chartered in 1869. Population in 1910, 12,381.

**Man"ito'ba,** a province of the Dominion of Canada, bounded on the n. by the North West Territories, on the e. by Hudson Bay and Ontario, on the s. by the United States and on the w. by Saskatchewan. Its length from north to south is 725 m. Its breadth varies from 270 m. in the south to about 500 m. in the widest part; the area is 252,000 sq. m. In 1912 the District of Keewatin was divided between Manitoba and Ontario, thus adding to Manitoba an area about two and one-half times its original size and making it a little larger than Saskatchewan and about the size of Alberta. It lies practically in the center of the land mass of the Continent of North America, and is midway between the eastern and western extremities of the Dominion. Population in 1911, 455,614.

Surface. The southern part of the province is included in the Valley of the Red River of the North and is a part of the bottom of Lake Agassiz, a large lake covering this part of the country in past geological ages. The region is a broad level plain. The eastern part of the province is in the Laurentian Plateau region, and is broken and hilly, well wooded and has many lakes. In the western part there is an escarpment with an altitude of 500 ft. This continues in a northwestward direction under the names of Pembina Mountain, Riding Duck and Porcupine mountains. This escarpment occupies all of the southwestern part of the province.

Rivers and Lakes. Manitoba is well supplied with lakes. Lake Winnipeg, Lake Winnipegosis and Lake Manitoba are in the central and northern parts. Lake Winnipeg is 270 m. long and has an area of 9400 sq. m.; Lake Winnipegosis has an area of 2030 sq. m.; Lake Manitoba, 1900 sq. m. The greater part of lakes Winnipeg and Winnipegosis is in Manitoba. There are also a number of smaller lakes. The Red River of the North and its tributary, the Assiniboine, drain the southern part of the province into Lake Winnipeg. The Pigeon, the Leaf and the Poplar rivers are in the northeastern part, and the Swan is the principal stream in the northwestern part.

Climate. The winters are cold and dry, with usually a considerable fall of snow. The summers are warm and pleasant. The dryness of the atmosphere prevents the extremes of temperature from being felt, as they are in localities where the atmosphere is charged with humidity. Throughout the year the climate is bracing and healthful. The rainfall averages 17 inches, the greater part of which occurs in early summer, so that the moisture is ample for agriculture.

Agriculture. Agriculture is the chief industry and gives occupation to the greater part of the inhabitants.

*Crops.* The soil and climate are suited to the growth of wheat, oats, barley, flax, potatoes and vegetables. Small fruits and, in some sections, apples are successful. Wheat is the chief crop in value and extensive areas are devoted to its culture. The soil and climate are such as to produce a grain of the highest grade, and Manitoba wheat is eagerly sought in foreign markets. Other grains in order of importance are oats and barley.

*Live Stock.* The country is well suited to live stock, and large numbers of horses, cattle, sheep and hogs are raised. Poultry is also an important source of income, nearly a million chickens, turkeys and geese being sold yearly.

Dairying has also become an important branch of the live-stock industry, the yearly income from dairying products being about $1,790,000.

*Statistics.* The leading products in 1911 were as follows:

CROPS

| | Bushels |
|---|---|
| Wheat | 61,058,786 |
| Oats | 73,786,683 |
| Barley | 23,999,239 |
| Flax, rye and peas | 1,387,779 |
| Potatoes | 8,317,241 |

LIVE STOCK

| | |
|---|---|
| Horses | 251,800 |
| Milch cows | 161,200 |
| Other cattle | 293,300 |
| Sheep | 29,600 |
| Hogs | 135,800 |

MANUFACTURES. Spruces, cedar, cottonwood and tamarack occur along the eastern border, and there are dense forests of white pine in the northwest. Lumbering is the most important manufacturing industry, but the product of the mills is practically all used within the province. The manufacture of flour is next in importance; then follow the manufacture of railway supplies and of machinery. In 1910 Manitoba had over 350 manufacturing establishments and the total value of their output exceeded $28,000,000. Manufactures are yearly increasing in number and extent. Winnipeg is the leading manufacturing center.

TRANSPORTATION AND COMMUNICATION. The Canadian Pacific, the Grand Trunk Pacific and the Canadian Northern railways cross the province from east to west. Each of these lines has numerous branches extending in various directions, and the Great Northern and other systems enter the province from the United States, so that the settled portions of Manitoba are well supplied with railway facilities. The Canadian Northern has extended a branch into the Swan River country, and other branch lines are being built as fast as the development of the province requires. Regular mails reach all localities, and the telegraph and telephone are found in all communities.



GOVERNMENT. The chief executive is the lieutenant-governor, who is appointed by the governor-general of Canada for a term of five years. He is assisted by an advisory council appointed by himself and consisting of heads of departments of the provincial government. The Legislature consists of an Assembly of 40 members. The provincial government is supreme in all matters pertaining solely to the province, provided their acts conform to the constitution and the laws of the Dominion. The judges of the courts are appointed by the Dominion Parliament for life.

EDUCATION. Manitoba has an excellent system of public schools. Attendance is compulsory. The 16th section of land in every township is set apart as school land, from which a school fund is created. There are graded and high schools in all the cities and larger towns. There are a provincial university, a provincial normal school and a provincial agricultural college at Winnipeg.

CITIES. The chief cities are Winnipeg, the capital; Brandon and Portage la Prairie.

HISTORY. Manitoba formerly belonged to the Hudson's Bay Company and was purchased by the Dominion Government in 1869. The first English settlement within the province was made in 1812 by a company of Scotchmen under Lord Selkirk. The early history of the territory was characterized by frequent conflicts between the Hudson's Bay Company and the North West Fur Company, until finally the Hudson's Bay Company purchased the rights of the other. After the purchase of the territory by the Dominion, the French half-breeds and some Indians started a rebellion under the leadership of Louis Riel, the chief cause being dissatisfaction over land claims. The rebellion was summarily put down and Riel fled to the United States. In 1873 Manitoba became a province of the Dominion of Canada. The completion of the

Canadian Pacific to the province opened this fertile region to settlement, and immigrants began to arrive in large numbers. In 1884 Riel returned and fomented a second rebellion, which caused the loss of several lives. He was captured and later tried and executed for treason. Since the beginning of the 20th century the province has developed rapidly.

**Manitoba Lake**, situated in about the central part of Manitoba about 60 m. s.w. of Lake Winnipeg, is about 125 m. long and about 25 m. wide, irregular in shape, with low and swampy shores. The lake is fed by the waters of several smaller lakes and by the White Mud River; the Little Saskatchewan, or Dauphin, River is the outlet into Lake Winnipeg. It was first visited by Chevalier de la Verendrye in 1739.

**Manitoulin,** *Man" i too' lin,* **Islands,** a group of islands separating Georgian Bay from Lake Huron. They extend in a long chain from east to west along the northern end of the lake and are separated from Canada by North Channel. The largest islands of the group are Great Manitoulin, or Sacred Isle, Cockburn and Drummond. Great Manitoulin is about 80 m. in length and has a rugged surface; its coast is indented by many large bays. Drummond Island is 24 m. long and is separated from Michigan by The Detour, the chief passageway for lake vessels entering the upper lake. With the exception of Drummond, which belongs to Michigan, the islands are a Canadian possession. The population, chiefly represented by Ojibway Indians, is about 2000.

**Manitowoc,** *Man" i to wok',* **Wis.,** a city and the county seat of Manitowoc Co., 77 m. n. of Milwaukee and about 112 m. n.e. of Madison, on Lake Michigan at the mouth of the Manitowoc River, and on the Chicago & North Western, the Wisconsin Central, the Ann Arbor & Pere Marquette and other railroads. Ferries connect it with Frankfort, Mich., and Ludington, Mich., and steamers ply between it and other lake ports. There is a good harbor, and considerable trade in flour, grain and dairy products is carried on. The town has large grain elevators, shipbuilding and repair yards, breweries, canning factories, hay presses, brickyards, creameries, saw and planing mills, and manufactories of machinery, agricultural implements, furniture, edge tools, glue, foundry products, cigars, leather and flour. Manitowoc contains the county insane asylum, a Polish orphan asylum, a county normal school, a Carnegie library, two hospitals and a business school. The first permanent settlement on the site of Manitowoc was made in 1836 and the place was chartered as a city in 1870. Population, 1910, 13,027.

**Manka'to, Minn.,** a city and the county seat of Blue Earth Co., about 90 m. s.w. of St. Paul, on the Minnesota River, and on the Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Chicago, St. Paul, Minneapolis & Omaha, the Chicago Great Western and other railroads. Among the industrial establishments are agricultural-implement works, a creamery, a candy factory, furniture factories, breweries, flour mills, foundries, machine shops, carriage factories, lime and cement works and knitting mills. A large trade in dairy and agricultural products is carried on. In the city are a Carnegie library, a fine Federal Building, a state normal school, the Tourteilotte Hospital, St. Joseph's Hospital and two commercial colleges. Minneopa State Park, containing Minneopa Falls, is four miles from the city. The place was settled about 1853 and was first incorporated in 1868. In the region surrounding Mankato occurred the uprising of the Sioux Indians in 1862, led by their chief, Mankato (blue earth). Population in 1910, 10,365.

**Mann, Horace** (1796-1859), one of the best known of American educators, born at Franklin, Mass. He graduated at Brown University, was admitted to the bar in 1823 and practiced at Dedham, Mass., and subsequently at Boston, until 1837. During this period he

served for six years as a representative in the State Legislature, and for four years as a state senator. In the Legislature, he was from the first identified with philanthropic interests. Withdrawing from a lucrative law practice and from politics in 1837, he rendered exceptional service for 11 years as secretary of the Massachusetts State Board of Education, went to Europe at his own expense in 1843 to study European methods, published 12 able *Annual Reports,* effectively aided in securing the establishment of the first normal schools in America, and aroused throughout the country an unprecedented interest in educational affairs. Succeeding John Quincy Adams in Congress in 1848, he served until 1853. As president of Antioch College, Ohio, from 1853 until his death, Mann exerted an influence felt throughout the West. Besides invaluable official reports, he wrote widely on educational questions.

**Man'na,** a sweet, flaky gum produced upon the trunk of the flowering ash, when incisions have been made in the bark. It owes its name to a chemical substance called mannite, though many gums not containing this principle are wrongly called manna. Italy is the chief source of the production of the gum, and groves of the flowering ash are there carefully tended. When the trees are about seven years old, the cuts are made, one incision a day, on one side of the tree the first year and on another side the second year, and so on, until the trees have been girdled. They are then allowed to die, and a second growth comes from the same root. Manna is employed in the preparation of medicine, but is used commonly only in the Mediterranean and South American countries.

**Manna,** the substance provided as food for the Children of Israel, while journeying through the wilderness on their way to Canaan. The Biblical narrative records that it fell from heaven. It consisted of small, round, white objects, having a sweetish taste. Each person gathered in the morning enough to last him through the day, but a double portion was gathered on the day before the Sabbath, which was a day of rest. Manna was provided only while the Israelites were in the wilderness.

**Manning, Henry Edward** (1808-1892), an English Roman Catholic cardinal, born at Totteridge, England. He graduated from Oxford in 1830, and was ordained in the Church of England two years later. In 1841 he became Archdeacon of Chichester. In 1851 he was converted to the Roman Catholic faith and was ordained a priest. In 1865 Manning was appointed Archbishop of Westminster, in which capacity he served during the remainder of his life. He was made cardinal in 1875.

**Man-of-War Bird.** See FRIGATE BIRD.

**Manom'eter,** an instrument for measuring the pressure of a gas by balancing the pressure against the weight of a column of liquid, either water or mercury. In its simplest form it consists of a U-shaped tube partly filled with mercury; one end of the tube is joined to the vessel containing the gas and the other end is left open to the atmosphere. The difference in height of the mercury in the two arms of the U is a measure of the difference in pressure of the combined gas and the pressure of the atmosphere. Such a manometer connected to the ordinary gas pipes would show that the gas pressure exceeded the atmospheric pressure by one-half to one and one-half inches of mercury; full atmospheric pressure, 14.7 lb. per square inch, is measured by a column of mercury about 30 inches high. See BAROMETER.

**Mans'field, Ohio,** a city and county seat of Richland Co., 54 m. s. of Sandusky and 79 m. s.e. of Cleveland, on the Erie, the Baltimore & Ohio and the Pennsylvania railroads. Interurban lines also connect with many near-by towns and cities. It is an important trade center for the adjacent country. There are manufactories of agricultural machinery, electrical supplies, paper, cigars, watch-cases, boilers, engine fittings, carriages, street cars, brass goods, pumps, webbing

and suspenders, electric-railway supplies and iron-foundry products. Mansfield is the seat of the Ohio State Reformatory, a children's home and several business colleges. It was settled in 1807, was chartered as a borough in 1828 and granted a city charter in 1857. Population in 1910, 20,768.

**Mansfield, Richard** (1857-1907), an American actor, born on Helgoland, an island in the North Sea. He was educated in Germany and England and came to Boston, Mass., at the age of 17, where he served as a clerk and studied art. The following year he returned to England, was engaged in comic opera, and came back to America, first appearing on the stage in New York in 1882. His wide fame as one of the greatest American actors was due to the high standards of artistic excellence which he maintained, and at all times his admirable acting was the result of patient study of details. The rôles in which he excelled were Cyrano de Bergerac, Monsieur Beaucaire, Brutus in *Julius Cæsar,* Shylock in the *Merchant of Venice,* Arthur Dimmesdale in Mansfield's own dramatization of the *Scarlet Letter,* Beau Brummell, Dr. Jekyll and Mr. Hyde and Peer Gynt.

**Mantegna,** *Mahn tane' yah,* **Andrea** (1431-1506), an Italian painter and engraver, the greatest master of the Paduan School. In 1459 he went to Mantua, where the remainder of his life was spent and where his chief work was accomplished, with the exception of a series of decorations at Rome, afterwards destroyed. Before leaving Padua, however, he executed a notable series of mural paintings in the Church of the Eremitani, which hold an important place in the development of painting in northern Italy. At Mantua his chief work was a realistic series of decorations in the Corte Castle. Another remarkable series, the nine cartoons called the *Triumph of Cæsar,* now at Hampton Court, London, and his *Triumph of Virtue Over Vice* and *Parnassus,* are worthy examples of the nobility, dignity and inventive and imaginative power which characterized his work. Mantegna was a highly cultivated man for his time, versed in classical literature and thoroughly familiar with antique art. He was a close student of nature and a pronounced realist.

**Man'tis, Praying Mantis** or **Soothsayer,** a family of peculiar Southern insects, of the order Orthoptera, whose habits have been discussed by naturalists from earliest times. The strange appearance of the creature as it stands upon its middle and posterior pairs of legs, with its forepair bent in attitude of prayer, rendered it once the object of grave inquiry and awed reverence. It was said to a diviner, a soothsayer, a prophet warning of pestilence and famine, a typical muezzin who called to prayer. One ancient writer says: "So divine a creature is this esteemed that if a childe aske the way to such a place she will stretch out one of her feet and show him the right way and seldome or never misse." A less poetical explanation of its devout attitude is that the supplicating forewings are raised to be ever ready for the hapless fly, which it seizes with unerring grasp and holds in its strongly-spined claws. Thus has the hypocritical mantis fallen into disrepute. Yet in its aid in exterminating the pestiferous typhoid fly, or house fly, it may return to its previous position of eminence. An interesting chapter on the mantis forms a part of J. H. Fabre's *Social Life in the Insect World.*

**Man'ual Training,** in its broadest sense that department of educational work which has for its chief purpose the training of the hand and the acquaintance with the materials used in industries. In this sense manual training includes the occupations of the kindergarten and the primary grades, such as stick laying, perforating cardboard and sewing designs traced upon cards. In its restricted sense, however, it pertains to the instruction in the theory and use of tools in the elementary processes in common trades and occupations, such as carpentry, blacksmithing, wood carving, and, in some instances, machine-

shop work and cooking and sewing; and instruction in the nature of common materials.

The first manual-training school in America was opened in 1880 in St. Louis as a department of Washington University, and was in charge of Dr. Calvin A. Woodward. Manual training was first introduced into the public schools in the Dwight School of Boston in 1882. At first the movement met with much opposition both in the elementary schools and the higher institutions. Most patrons believed that when in school pupils should devote their time to the study of books, and that time spent in manual training was wasted. It was soon found, however, that those pupils in the elementary schools who had the advantage of manual training made more rapid progress in their studies than those who were deprived of this advantage. Lack of system at first also delayed the extension of the work. But gradually each obstacle was overcome, and, before the end of the first decade of the 20th century, manual training constituted a feature of practically all city courses of study, and was likewise included in some courses for rural schools.

Manual training does not aim to teach trades in the elementary schools, but to give such systematic training to the hands through the use of tools and materials as will enable the pupil to learn any trade he may desire in much less time than it would require without this training. In the higher technical schools trades are usually taught. When properly taught, manual training has many advantages. It is of great industrial value to those who are to earn their living by the use of their hands. The cultural value is great, irrespective of the occupation which the pupil may follow, since what the pupil *does* makes the most lasting impression on him. It trains the powers of observation as nothing else can. It is a correct stimulus to systematic thinking, for when the pupil starts to construct an object he must plan his work systematically. It increases the pupil's power to do, gives him skill in the use of tools and impresses upon him the dignity of labor. See KINDERGARTEN; TRADE SCHOOLS; EVENING SCHOOLS; EDUCATION, INDUSTRIAL.

**Manure'**, a substance placed upon the soil to increase its productive power. Commercial manures, also termed artificial and mineral manures, are generally spoken of as fertilizers (See FERTILIZER). The natural manures are of two kinds, green manures and stable manures. The former are crops, generally having long roots that contain bacteria, able to take up a great amount of nitrogen from the air and the subsoil, and thus leave the soil richer in nitrogenous products than they found it. Such are clover, alfalfa, soy beans, cow peas, rye and barley. The ordinary treatment of fields with green manures is to plow the crop under when nearly mature.

Stable manures renew the potash, phosphoric acid and some of the nitrogen taken out of the soil by plants. They furnish the best value when half rotted, but they should be preserved under cover, as otherwise they give up much of their nitrogen content. Because of their bulk they are not easily transported, but it is estimated that on the ordinary farm, fertilizer worth at least $350 is produced annually, which is available for return to the soil. That procured from the stables of horses and cows and from poultry yards is considered the most valuable. Consult: Aikman, *Manures and Manuring*.

**Manure Spreader,** a farm implement to spread manure or other fertilizer evenly upon a field. Those in ordinary use consist of a box wagon having small forewheels and large hind wheels, both sets of which are of steel, in order to resist the action of the acid in the manure. The hind wheels are also the driving wheels which communicate motion to the beater and the apron. The apron is a flexible, movable frame which lies in the bottom of the box and is rolled under by the motion of the wheel. The manure, which is loaded upon the

apron, is thrown off by means of a cylindrical frame set with several rows of long, steel teeth and known as the beater. The beater is located at the rear of the box and distributes the manure evenly upon the ground as fast as it is fed by the apron. The value of the spreader is apparent, since it is practically impossible to distribute the fertilizer evenly by means of a fork.

**Maoris,** *Mah' o riz,* the native inhabitants of New Zealand. They are a sturdy people with longer bodies and shorter legs than Europeans. They have a slightly brown skin and black eyes and hair. When first known they had brought tattooing and carving to a high degree of perfection. They were divided into tribes, each ruled by a chief who had absolute authority over his subjects. Formerly they were among the most fierce and warlike tribes of the South Pacific, but after they were conquered by the English they rapidly adapted themselves to the customs of civilization and are now an industrious and law-abiding people.

**Map,** a delineation on a plane surface of the whole or a part of the earth's surface. Since it is impossible to make an accurate delineation of a spherical surface on a plane, all maps are more or less inaccurate. To overcome this difficulty, a method of delineation, known as projection, is resorted to. Several systems or projections are in use, but only two are ordinarily seen. These are the polyconic and Mercator's projections. The polyconic projection is designed by rolling over the surface on which the map is to be drawn, a cone, on whose surface have been drawn several circles parallel to the base and equally distant from each other, and on which there are also straight lines extending from the apex to the base. As the cone revolves over the surface, the base and parallel circles will describe concentric circles, which represent parallels of latitude, and the straight lines will make meridians of longitude. These lines all radiate from a point, as the meridians radiate from the poles. Since the convergence of these lines approximates quite closely the convergence of the meridians on the earth's surface, maps drawn to this projection are sufficiently accurate for most purposes, and it is very largely employed in making maps in ordinary use.

Mercator's projection represents the earth as a cylinder, and the lines representing parallels and meridians cross at right angles. Mercator's projection is used for commercial maps of the world and to some extent by navigators. Whatever the projection used, the making of an accurate map requires that an accurate survey of the regions precede the construction of the map. All maps are drawn to a scale; that is, a certain space on the map, as one inch, represents a certain distance on the earth's surface, as 100 m.

Special maps are made for various purposes. Relief maps represent the contour of the surface either by the use of different colors for different altitudes, or by the use of plaster of Paris or some other materials by which mountains, plains and valleys can be represented. On all such maps the height of mountains and depth of valleys are greatly exaggerated. Maps used by navigators show in detail the outline of coasts, location of islands, sunken rocks and other obstructions to navigation, and the depth of water along the coast. Product maps show where certain products can be raised to advantage, and so on.

**Ma'ple,** the name of a large number of ornamental trees, grouped in the Maple Family and common in all parts of the north temperate zone. Once known, the maples as a rule are easily recognized by their straight, solid trunks, shapely tops and pointed, commonly three-lobed leaves, borne on long, wiry stems. The flowers are regular and hang in loose clusters, which are almost the same color as the bright-colored new leaves. The fruit is a pair of winged seeds, which can be borne for some distance by the wind and, when located favorably, have the peculiar habit of suddenly lifting the wing in the air

as the tiny seed germinates and sends its root into the ground. The wood of the maple is especially useful; the rock and the red maple furnish the wavy-grained woods known as bird's-eye maple and blister maple, which are valuable for furniture and for interior decoration; other varieties are used for fuel, the manufacture of woodenware, pulp for paper making, floors and common furniture. The rock, or sugar, maple and the black maple are valued for their sugary sap (See SUGAR, subhead *Maple Sugar*).

The different species of maple common in the United States are: the sugar maple, also known as rock maple and hard maple, with rugged, scaly bark; the black maple, whose bark cracks in long, hard strips and whose branches are less graceful than those of most maples; the mountain maple, with light gray or almost white, smooth bark, generally spotted with lichens; the moose, or striped, maple, known for its tough, flexible bark, which when young is striped with pale green, vertical lines; the silver-leaf maple, generally an immense tree, whose leaves are silvery white underneath; the soft maple, also called scarlet maple and red maple, which is noted for the brilliancy of its autumnal coloring; and the ash-leaved maple, also known as box elder.

The maple leaf is the emblem of Canada. See BOX ELDER.

**Maracaibo,** *Mah" rah ki' bo,* the chief seaport of Venezuela, is situated on a strait connecting Lake Maracaibo with the sea. It has an excellent harbor and a number of fine buildings, including a university, a Chamber of Commerce, a theater and a number of hospitals and asylums. The principal exports are coffee, timber, hides, ores and cocoa. The population is about 50,000.

**Marajó,** *Mah" rah zho',* or **Johannes,** a large island off the north coast of Brazil between Pará and the Amazon rivers. Its length is 180 m. and width 150 m. The surface is low, and the island is intersected by two rivers. The population is sparse.

**Marat,** *Ma" ra',* **Jean Paul** (1744-1793), a leader of the French Revolution, born near Neufchâtel, Switzerland. He was well educated, especially in the languages, and he studied and practiced medicine in Paris, where he also wrote several scientific and philosophical treatises. At the outbreak of the Revolution he became one of its most ardent supporters, and as a leader of the Radical Party he wielded a strong influence through his paper, *The People's Friend.* Marat was supported by the lowest classes, for his violence alienated the better element among the Revolutionists. He was ordered arrested in 1790, but avoided capture and became a member of the Commune and later of the Convention. He voted for the execution of the King and was urgent of the annihilation of the old regime. It was chiefly Marat's influence which accomplished the overthrow of the Girondists. He was assassinated by Charlotte Corday, and after his death was long known as the "martyr of the people."

**Mar'athon, Battle of,** one of the most important battles of history. Marathon is a plain on the coast of Attica in Greece, 20 m. north of Athens. Here, in 490 B. C., about 10,000 Athenians, aided by 1000 Platæans, met the Persian army of 20,000. Miltiades, the Athenian general, had stationed his troops on rising ground and arranged them so that his front was as long as that of the Persians. He had also strengthened the wings at the expense of the center, and though the center broke as the Athenians rushed down, the wings were victorious and closed in upon the Persians. When the invaders saw that they were in danger of being cut off from their ships, they fled in a rout toward the shore. Marathon is one of the 15 decisive battles of the world, and is so regarded because the signal defeat of the Persian army prevented the conquest of Europe by the nations of Asia.

**Mar'ble,** a crystalline variety of limestone capable of taking a high polish. Pure marble is white, but various im-

purities produce different colors and different shades of the same color, so that there are many varieties, ranging from pure white to almost jet black. Carbonaceous matter produces a gray or a bluish tint. Compounds of iron give pink, red, yellow or brown hues. The "clouded" effect is produced by the irregular distribution of the impurities, and the beautiful "veining" effects are caused by the presence of foreign matter which entered fissures when the marble was broken by movements of surrounding rock.

The purest white marble is used for stairways and is the most expensive. The finest grade is obtained from Carrara, Italy, and is known as Carrara marble. Other marble quarries are also found in lands on the Mediterranean Sea. Other varieties of marble are extensively used for monuments, headstones and in buildings, especially for finishing interiors. The United States is the leading country of the world in the production of marble, and there are extensive quarries in the southwestern part of Vermont, in Georgia, in Tennessee and in several other states. In these quarries and the mills connected with them, practically all the work is done by machinery. The rock is cut from its bed by channeling machines, and there is but little waste.

**Marblehead, Mass.,** a city and summer resort of Essex Co., 18 m. n.e. of Boston, on Massachusetts Bay and on the Boston & Maine Railroad. It is situated on a small peninsula, very rocky and uneven, and has Massachusetts Bay on the south and east and Salem Harbor on the north. Clifton, Marblehead Neck and Devereux are near-by villages. Marblehead has a commodious harbor and is one of the oldest and quaintest towns of New England. It is a favorite yachting and summer resort. The chief industries include boat building, fishing and seed growing and the manufacture of boots and shoots. Marblehead was for a time the second settlement in importance in the colony, Boston being the first. The town was settled by immigrants from Guernsey and Jersey in 1629 and until 1649 was a part of Salem. Population in 1910, 7338.

**Marbles,** small spheres, made at one period almost exclusively from chips of marble, but now made also from various other substances. In Saxony, where a hard limestone is found, small cubes are cut out and thrown, 100 or 150 at a time, on a stone slab which has numerous concentric circles cut in its surface; then a block of oak is lowered upon the little cubes and revolved by machinery while water flows in upon the slab. In about 15 minutes the cubes are thus worn into spheres, and three such mills are said to manufacture 60,000 marbles per week. The common agates are made in large quantities at Oberstein. The bull's eye and striped marbles are molded, then baked, painted and glazed. In very early periods, children used round nuts and smooth stones for various games; and today in every part of the world marbles are used in one way or another by a large proportion of the children. No specific rules for the game have, however, been formulated, and practically every locality plays according to its own rules.

**Marcellus,** *Mar sel' us,* **Marcus Claudius,** a Roman general who flourished in the third century B. C. He won several victories over Hannibal during the Second Punic War. In 214 B. C. he took charge of the war in Sicily, two years later becoming master of Syracuse. In 208 B. C. he was elected consul for the fifth time and again took charge of the army against Hannibal, but was slain.

**March,** the third month of the year, containing 31 days. This was formerly the first month of the Roman year, and until 1752 the first month also of England's year. Its name comes from the Roman god of war, Mars. The vernal equinox occurs about the 21st of this month. See YEAR; MONTH; EQUINOX.

**March, Francis Andrew** (1825-1911), an American author and philologist, born at Millbury, Mass., and educated at Am-

herst. He studied law in New York and was there admitted to the bar; because of ill health he spent the succeeding years in teaching. He became president of the American Philological Association in 1873 and later of the Modern Language Association. March was the editor of numerous Greek and Latin texts, was the consulting editor of the Standard Dictionary and was the head of the American staff of an English dictionary. He was the author of *A Method of Philosophical Study of the English Language, Comparative Grammar of the Anglo-Saxon Language* and an *Anglo-Saxon Reader.*

**Marconi,** *Mar ko' ne,* **Guglielmo** (1875- ), an Italian electrician, born near Bologna, Italy, and educated at the university of that city. He early gave promise of remarkable ability and was soon associated with Professor Righi in the study of physical phenomena. The world owes to Marconi the wireless telegraph, now in wide use on land and sea. Because of the apathy of the Italian Government, Marconi took his plans to England, where they were immediately accepted, and the Marconi Wireless Telegraph Company was founded. He has made many improvements in his system, which he first exhibited in the United States in 1901. See TELEGRAPH, WIRELESS.

**Mar'cus Aure'lius.** See AURELIUS, MARCUS.

**Mardi Gras.** See SHROVE TUESDAY.

**Maren'go, Battle of,** a great battle between the French under Bonaparte and the Austrians commanded by Melas, fought June 14, 1800, at Marengo in Italy. At first the Austrians were successful, but the French general, Desaix, reinforced Napoleon, and the Austrians were surprised and defeated. As a result of this battle, Genoa, Piedmont and Milan were lost by the Austrians and the power of Napoleon was established.

**Mar'garet** (1353-1412), sometimes called the "Northern Semiramis," Queen of Denmark, Norway and Sweden. She was the second daughter of Waldemar IV, King of Denmark, and the wife of Haakon VI of Norway. The death of Haakon, in 1380, left her sole guardian of her son, Olaf, whose death in 1387 made her ruler of Norway and Denmark. Meanwhile, King Albert of Sweden had so alienated his subjects that they offered her their crown. Having defeated Albert in battle, she entered Stockholm in 1397, producing her remarkable Union of Kalmar, for the permanent union of the three kingdoms.

**Margaret of Anjou,** *Ahn" zhoo',* (1430-1482), daughter of René, titular King of Naples, and wife of Henry VI of England, whom she married in 1445. Because of Henry's ill health, she was virtual sovereign, but a secret contract at her marriage, relinquishing Maine and Anjou to France, caused dissatisfaction, and she was blamed for the English loss of all French possessions save Calais. When the Duke of York contested her power, the Wars of the Roses commenced (See ROSES, WARS OF THE), and after 20 years of struggle she was defeated and imprisoned, till redeemed by Louis XI of France.

**Maria Theresa,** *Ma ri' a Te re' sa,* (1717-1780), Queen of Hungary and Empress of Germany. She was the daughter of Emperor Charles VI. After her father's death, she was attacked by France and Bavaria in Bohemia, and Frederick the Great seized Silesia. By the treaty of Aix-la-Chapelle in October, 1748, she made peace with Prussia by giving up Silesia, and by giving other provinces to Spain she secured her husband's election as emperor. She allied herself with France and Russia to avenge herself upon Frederick (See SEVEN YEARS' WAR). Maria Theresa's husband, Francis I, died in 1765, and from this time her eldest son Joseph was associated with her in the government. Among the chief reforms of Maria Theresa's reign were those in the army, in the courts of law and in education.

**Marie Antoinette,** *Ma" re' Ahn" twa" net',* (1775-1793), Queen of France and daughter of Francis I and Maria Theresa. At 15 she was married to the Dau-

phin, who was later crowned as Louis XVI. Her dislike of court etiquette and her frivolity and extravagance led her into many indiscretions and she steadily influenced the King against reform and lavished honors upon her favorites. She went with her husband in his imprisonment in the Temple, and acted with patient dignity in the trying days that followed. She was charged with extravagance, with having held communication with the enemies outside of France, and with having encouraged those within to arm themselves against the republic. She was found guilty of these charges and was executed October 16, 1793.

**Marie Louise,** *Ma re' Loo ez',* (1791-1847), second wife of Napoleon I and daughter of Francis I of Austria. She married Napoleon following his divorce from Josephine, and the next year, in March, 1811, bore him a son. At the opening of the campaign of 1813 Napoleon appointed her regent, and on his abdication she went to Austria. At the Congress of Vienna she was awarded the duchies of Parma, Piacenza and Guastalla, which she ruled until her death.

**Ma"riet'ta, Ohio,** a city and county seat of Washington Co., 80 m. s.e. of Zanesville and 132 m. s.e. of Columbus, the capital of the state, on the north bank of the Ohio River, at the mouth of the Muskingum River, and on the Baltimore & Ohio Southwestern, a branch of the Pennsylvania, and the Marietta, Columbus & Ohio railroads. The Ohio River is here spanned by a bridge which connects Marietta with Williamstown, W. Va. There is an extensive production of and trade in petroleum, which is obtained in the vicinity. There are also distilling, brewing and boat-building industries. The manufacturing establishments include glassworks, furniture factories, oil-well tool shops, brick plants, flour mills, bicycle-rim and boiler shops, carriage and wagon works, casket shops and factories for making lumber products and leather. The city has large commercial interests through its river trade.

The Marietta College, coeducational, founded in 1835, is located here. There is a public library containing a large number of volumes, which is noted for its works on the history of the Northwest. Marietta is the oldest town in the state, having been founded in 1788 by Gen. Rufus Putnam and people from New England under the authority of the Ohio Company, who had secured a grant of lands on both sides of the Muskingum River. The place was named in honor of Marie Antoinette. The Northwest Territory was organized here in July, 1788. Marietta was incorporated as a town in 1800. In 1890 the village of Harmar was annexed to the city. Here are found some earthworks of the ancient mound builders. Population in 1910, 12,923.

**Marigold,** *Mair' i gold,* a garden flower of the Composite Family, native in Europe. The leaves are stemless and oblong; the velvety, double flowers are yellow or brownish and have a heavy odor. The marsh marigold, often wrongly called cowslip, is a member of the Crowfoot, or Buttercup, Family. It is an early spring wild flower with a cluster of rounding, dark green, juicy leaves and beautiful golden flowers. It is common along low streams and in marshy places. The stems and leaves are used as greens.

**Marines,** *Ma reens',* men trained as infantry or artillery soldiers for service in the navy. The marines, or marine corps, constitute the exclusively fighting portion of the personnel of a man-of-war, doing police duty and serving in landing expeditions. They also do duty on land at seaports. They are members of the navy trained to serve also on land, as the naval militia are members of the army trained to serve in time of need at sea. See NAVY; ARMY; NAVAL RESERVE.

**Marinette,** *Mar" i net',* **Wis.,** a city and the county seat of Marinette Co., about 50 m. n.e. of the city of Green Bay and 178 m. n. of Milwaukee, on Green Bay, an arm of Lake Michigan, at the mouth of the Menominee River. Railroads entering the city are the Chicago, Milwaukee & St. Paul, the Chi-

cago & North Western, the Wisconsin & Michigan and others; and steam and electric trains and bridges connect the town with Menominee, on the opposite side of the river. Marinette has a fine harbor and a large and growing lake commerce, chiefly in iron and lumber. There is good water power at this point and manufacturing is an important industry. Chief among the manufactories are steam thrashing-machine works, paper and pulp mills, pail and broom factories, cabinet shops, gas- and traction-engine works, furniture factories and ironworks, and factories for boats, boilers, woodenware, agricultural machinery, furniture and boxes.

Among the important buildings and institutions are a Federal Building, two hospitals, fine school buildings, Our Lady of Lourdes' Institute, the Stephenson Public Library, founded by Senator Isaac Stephenson, and a county agricultural school and training school for rural teachers. At Chautauqua Park, a few miles from Marinette, on Green Bay, the Northern Chautauqua Assembly holds its annual sessions. Marinette was settled on the site of a Menominee Indian village in 1830 and was named for the daughter of an Indian chief. The place was chartered as a city in 1887. Population in 1910, 14,610.

**Mar'ion, Francis** (1732-1795), an American soldier, born near Georgetown, S. C., of Huguenot descent. He served (1761) in the Cherokee War as a lieutenant under Moultrie, entered the service as captain when the Revolution began, and soon became brigadier-general. He accompanied Moultrie on his occupation of Ft. Sullivan, June, 1776. Later he was placed in command of that post, took part in the unsuccessful attack on Savannah and fled to North Carolina. Returning to South Carolina, Marion organized a small force, varying from 20 to 70 men, with which he harassed the British, and distinguished himself at Nelson's Ferry and at Eutaw Springs. In 1782 he was elected to the State Senate and later served in the Constitutional Convention. Marion was the greatest partisan leader of the Carolinas, and the British called him the "Swamp Fox."

**Marion, Ind.,** a city and county seat of Grant Co., 40 m. s.e. of Logansport and 68 m. n.e. of Indianapolis, on the Mississinewa River and on the Cleveland, Cincinnati, Chicago & St. Louis, the Chicago, Cincinnati & Louisville and other railroads. Interurban electric lines connect the city with Indianapolis and other towns and cities. It has abundant water power and a good supply of natural gas. Marion contains flour, saw and planing mills, pulp and paper mills, linseed-oil works, foundries, brickworks, machine shops, rolling mills, window-glass, fruit-jar and bottle factories, furniture and bedstead works and cornice works. A National soldiers' home is located three miles south of the city. Marion is the seat of a large normal college. There is a fine public library. Population in 1910, 19,359.

**Marion, Ohio,** a city and county seat of Marion Co., 35 m. s.w. of Mansfield and 45 m. n. of Columbus, the capital of the state, on the Erie, the Hocking Valley and the Cleveland, Cincinnati, Chicago & St. Louis railroads. It is situated in an agricultural district and has notable lime and stone industries. There are also malleable ironworks, silk mills, lime kilns, a piano factory, steam-shovel works, agricultural-machine shops, steam-engine and boiler works, wood-pulley works and a mattress factory. A home for aged women and Sawyer Sanitarium are located here. Marion was settled by people from Rhode Island in 1815. It was incorporated in 1820 and received a city charter in 1890. Population in 1910, 18,232.

**Marion Harland.** See TERHUNE, MARY VIRGINIA.

**Mariotte's,** *Mah" re ots',* **Law.** See GASES, LAWS OF.

**Mar"ipo'sa Lily.** See TULIP.

**Ma'rius, Caius** (about 156-86 B. C.), a Roman general of lowly birth, born near Arpinum. He came into prominence as a soldier of the younger Scipio in 134 B. C., and 15 years later he

became a tribune, in which position he won the hatred of the nobles by his vigorous defense of the cause of the people. Not long after came the threatened invasion of Italy, which was stayed by Marius, who annihilated the German army at Aquæ Sextiæ (Aix) in southern Gaul, and the next year had the same success against the Cimbri. Contrary to the law that no one should fill the office of consul for two successive years, Marius was elected to the position six times in succession, for it was felt that he alone could cope with the difficulties that faced the republic. He became jealous of the growing power of Sulla, who had been appointed general against Mithridates by the Senate, while Marius was chosen by the people for the same task. Sulla led an army against Rome, became master of the city and drove Marius into exile; then he left for his campaign in the East. After the departure of Sulla, Marius returned to Italy, captured Rome and, with Cinna, proclaimed himself consul without the pretense of an election. He died 17 days later. Marius was uneducated, coarse and rough in manner, and his influence in time of peace was not so great as his skill in warfare.

**Mar'joram,** an old-fashioned herb of the Mint Family, grown as a seasoning plant or as an aromatic for linen chests. It is a square-stemmed plant, with hairy, oval leaves often marked by oily dots. The purplish-white or pink flowers are crowded together upon leafy spikes, and each blossom has the characteristic two-lipped corolla, common to this family. The time of bloom is July or August. Marjoram was introduced from Europe, where it is much valued as a seasoning herb.

**Mark An'tony** (83-30 B. C.), a Roman general and friend of Cæsar. His Latin name was Marcus Antonius. He served with Cæsar in the Gallic Wars, took sides with him in his war with Pompey, and was consul with him in 44 B. C. After Cæsar was assassinated, Antony aroused the people against the conspirators, and, joining forces with Octavius and Lepidus, defeated Brutus and Cassius at Philippi (See AUGUSTUS). The Roman world soon fell to Antony and Octavius, as they shortly disposed of Lepidus. Antony had the East and Octavius the West. Each gave up his friends at the request of the other, and it was at this time that Cicero fell a victim to the hatred of Antony. Antony fell in love with Cleopatra, Queen of Egypt, and neglected his wife and his government. In 32 B. C. Octavius declared war against Cleopatra and deprived Antony of his consulship and of his share of the Roman world. Antony was defeated by Octavius at the Battle of Actium, 31 B. C., and retreated to Egypt, where he suffered a second defeat. He committed suicide by falling on his sword when he was falsely told of Cleopatra's death. See CÆSAR, CAIUS JULIUS; CLEOPATRA.

**Markham,** *Mar' kam,* **Edwin** (1852- ), an American poet and lecturer, born in Oregon City, Ore. After completing his education he was principal and superintendent of schools in California, and won fame upon the publication of his poem, *The Man with the Hoe.* Millet's painting of the same name suggested the theme. Among other writings are *Lincoln, and other Poems, The Social Conscience* and *The Hoe-Man in the Making.*

**Mark, Saint,** the author of the *Gospel of St. Mark* (See GOSPELS, THE). He is probably the person spoken of in the *Acts of the Apostles* as "John, whose surname was Mark." His mother, Mary, was a follower of Christ, and her house at Jerusalem became the refuge of the early Christians there. Mark was the cousin of Barnabas, and he accompanied Paul and Barnabas on their first mission. He is the reputed founder of the Alexandrian Church.

**Mark Twain.** See CLEMENS, SAMUEL LANGHORNE.

**Marl,** a term applied to a variety of rocks and soils of widely varying composition, but usually employed to designate a mixture of calcium carbonate and clay. Marls become friable upon expo-

sure to air and readily crumble to dust. If then mixed with water, the material becomes pasty and the presence of carbonate of lime will cause it to effervesce. The typical marls are calcareous marl, that in which lime predominates; and clay marl, or argillaceous marl, that which contains a large proportion of clay. Marls are called indurated when hard; earthy when soft. They are found in masses or beds in association with sand, gypsum, clay or limestone, and usually contain fossil remains. The marls of the United States are roughly divided into three classes: (1) blue marl, or shale marl, which contains a large percentage of carbonate of lime, and is, therefore, of great agricultural value; (2) chalky marl, coarse in texture and containing from 50 to 95 per cent of lime; and (3) cretaceous marl, found chiefly in New Jersey, and commonly known as green sand marl. It is composed chiefly of clay and green sand, with only one or two per cent of carbonate of lime. The chief value of marls is as fertilizers, either of worn-out soils or for enriching those naturally poor. Owing to the fact that their efficacy depends largely upon quantity, this kind of soil treatment is economically impracticable, except for soils located in close proximity to the marl deposits.

**Marlborough,** *Marl' bo ru,* **John Churchill,** DUKE OF (1650-1722), an English general and statesman. He became a soldier in his youth and made rapid advancement, strengthening his position at court by his marriage with Sarah Jennings, an attendant of Princess Anne. On the accession of William III Churchill went over to the King's side, but he was soon charged with treasonable communication with James II, and was confined in the Tower. Not long afterwards, however, he obtained his release. When the War of the Spanish Succession broke out William made Churchill commander of the English forces in Holland. The following year (1702), on the accession of Queen Anne, he was created captain-general of the forces at home and abroad, and in the campaign of this year drove the French out of the Spanish Guelders and took several towns. He was then created Duke of Marlborough. With Prince Eugène of Savoy, he won the famous victories of Blenheim, Oudenarde and Malplaquet. Marlborough ranks next to Wellington among England's greatest generals.

**Marlborough, Mass.,** a city of Middlesex Co., 15 m. e. of Worcester, on the Boston & Maine and the New York, New Haven & Hartford railroads. St. Ann's Convent and Academy are located here. The principal manufactures include automobiles and tires, boots and shoes, wagons, carriages, electrical machines and appliances, hose pipe, woodenware, cigars, lamps and machine-shop products. Marlborough was settled in 1656 by a colony from Sudbury, Mass., and four years later was incorporated as a town. In 1676, during King Philip's War, the town was nearly destroyed by the Indians. A city charter was granted in 1890. Population in 1910, 14,579.

**Marlowe,** *Mar' lo,* **Christopher** (1564-1593), an English dramatist, born in Canterbury. He studied at King's School, Canterbury, and graduated at Cambridge in 1583. By 1587 he was in London, writing for the stage. His early death cut short a brilliant literary career, and he showed promise of equaling Shakespeare. Although he devoted only six years to the drama and produced only four plays, he is recognized as the father of English tragedy and the originator of English dramatic blank verse. The melody of his lyrics is admirable; the splendor, sublimity and tragic intensity of his most elaborate scenes have no parallel in the whole range of tragedy. His two poems, *Passionate Shepherd* and *Hero and Leander,* are almost faultless in melody and technique. The four great plays are *Tamburlaine the Great, Dr. Faustus, The Rich Jew of Malta* and *Edward the Second.*

**Marlowe, Julia** (1870- ), an American actress, born near Keswick, England. At the age of five she re-

moved with her parents to the United States, and lived for some time in Cincinnati, Ohio. She began to take part in juvenile performances when she was 12 years old. In 1887 she appeared in New York, and her rôle as Parthenia in *Ingomar,* which was presented in Boston the following year, was a decided success. She was married to Robert Taber in 1894, but they were divorced five years later. Together with E. H. Sothern (to whom she was married in 1911) she has played in several Shakespearean dramas. Among her leading rôles are Viola in *Twelfth Night,* Rosalind in *As You Like It,* Highland Mary in *For Bonnie Prince Charlie* and Barbara Frietchie in Clyde Fitch's play of that name. She has also acted in *When Knighthood Was in Flower, Romeo and Juliet, Much Ado About Nothing, The Taming of the Shrew, Hamlet, The Merchant of Venice* and *Salome.*

**Mar'mora, Sea of,** a small body of water connecting with the Black Sea by the Bosporus and with the Ægean Sea by the Strait of Dardanelles. It is 140 m. long, 45 m. wide and from 600 to 4000 ft. deep. Among its islands is the Marmora, famous for its marble and alabaster quarries.

**Marmoset,** *Mar' mo zet",* a family of small South American monkeys, characterized by having 32 teeth. The members of this family live high in the tree tops of the forest and are unusually shy. Their furry coats are gray, brown or black; their faces are naked, but often bear cottony patches of hair upon cheeks, chin or ears. Frequently, too, the hair of the neck is lengthened into a mane. The natives trap them and make pets of them, or send them to Northern menageries and zoos, where they make clever and interesting captives.

**Mar'mot,** a name applied chiefly in the Old World to a group of Rodents of the Squirrel Family. They have coarse, gray fur, stout little bodies and slender but strong limbs. They live in galleried burrows upon hill or mountain sides, and come forth by day to eat of the tender shoots and vegetables which form their food. They may frequently be seen at the opening of their burrows, sitting upon their haunches and listening with keen ears for the approach of a foe.

The marmot in the United States is called the woodchuck or the ground hog. See WOODCHUCK.

**Marque, *Mark,* and Repri'sal, Letters of.** The word *marque* means boundary or landmark. A letter of marque is a commission in writing issued by a national government to a private person, giving him authority to pass beyond the three-mile international boundary, and capture on the high seas the persons or property of subjects or citizens of another country who have inflicted injury upon his country. *Reprisal* is another term for *retaking.* A vessel whose commander bears a letter of marque and reprisal is called a privateer. International law recognizes the right of a nation to adopt this mode of redress from any country with which it is at war. During the last 50 years the great nations of Europe have generally agreed among themselves to abolish privateering.

**Marquette, *Mar ket',* Jacques** (1637-1675), a French Jesuit missionary and explorer in America, born in Laon, France. His family belonged to the aristocracy, and until 17 years of age Jacques was reared in luxury. At this time he entered a Jesuit college and prepared for the priesthood. He soon gained reputation as a linguist and a preacher and was noted for his deep piety. In 1666 he came to America. Soon after his arrival at Quebec he was sent to Three Rivers to learn the Algonquin language, which he acquired with remarkable facility. In 1668 he went to Lake Superior, where he founded a temporary mission at Sault Ste. Marie. The next year he was sent to La Pointe de St. Esprit, near the western end of Lake Superior. Here he remained until 1671, when the hostility of the Sioux compelled Marquette and his Huron followers to abandon the mission and move eastward. He went

to Mackinaw, where he founded the mission of St. Ignatius on the site of the present town of St. Ignace. While at St. Esprit, Marquette learned much of the Mississippi River, which he longed to explore for the purpose of carrying the Gospel to the Indians residing on its banks.

In December, 1673, Louis Joliet arrived at St. Ignace with a commission to take Marquette as a companion and explore the Mississippi. The winter was spent in preparation for the voyage, and on May 17, 1673, the expedition set out in two canoes. The route was via Green Bay, the Fox River to its portage, thence down the Wisconsin to the Mississippi, which stream they descended to its confluence with the Arkansas. The return was made by way of the Illinois River and Lake Michigan. Green Bay was reached the last of September. The expedition traveled over 2500 m. through an unknown country without losing a man or a canoe.

On their passage up the Illinois River the explorers found, near the present village of Utica, Ill., a large village of the Illini, or Illinois, Indians, upon whom Marquette made a strong impression, and they exacted from him a promise that he would return and establish a mission among them. But the long journey upon which he had engaged was too strenuous for his frail system, and he returned to Green Bay broken in health. Here he remained until October, 1674, when he began the journey to the Illinois. His party reached the Chicago River in December, but Marquette's strength would permit of his going no farther, and a log cabin was built in which he and two companions spent the winter. This was the first building erected by white men on the site of Chicago, and its location is now marked by a large cross. In the spring of 1675 Marquette resumed his journey and reached the Illinois village early in April. Here he established a strong mission, but failing health compelled him to give up the work. He attempted to return to St. Ignace, but he died on the banks of a little stream near the present site of Ludington, Mich. The next spring the Indians carried his bones to St. Ignace, where they were buried.

Marquette's saintly life and unselfish devotion to the welfare of the Indians gave him a remarkable influence over them, and he is the ideal French Jesuit missionary of New France. The State of Wisconsin has placed his statue in the rotunda of the Capitol at Washington, and a heroic statue in bronze adorns the Government Park at Mackinac Island. Consult Parkman, *La Salle and the Discovery of the Great West;* Thwaites, *Father Marquette.*

**Marquette, Mich.,** a city and the county seat of Marquette Co., 58 m. n.w. of Escanaba and 155 m. w. of Sault Ste. Marie, on Iron Bay, an inlet of Lake Superior, and on the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Marquette & Southwestern, the Duluth, South Shore & Atlantic and other railroads. The city is beautifully situated on a bluff 100 ft. above the lake and is in a rich iron-ore region. It has a fine harbor and well-equipped ore docks, and is an important port of entry. It is one of the chief industrial and commercial centers of the Lake Superior district. In the town are foundries, machine shops, sash, door and blind factories, carriage works, a wood-alcohol plant, a brewery, lumber and planing mills, bottling works, flour mills and an acetic-acid plant. In the vicinity are valuable quarries of red-brown sandstone.

Notable features of Marquette are the United States Government Building, courthouse, city hall, new manual-training and high school, the Michigan State Normal School, the Peter White Public Library, the opera house, the Protestant Episcopal and Roman Catholic cathedrals, the Upper Peninsula State Prison and House of Correction and St. Mary's Hospital. Presque Isle Park, a beautiful headland north of Marquette, was presented to the city by the Federal Government. The first settlement on the site of Marquette was made about 1845

and named Worcester; the place was incorporated as a village in 1859 and chartered as a city in 1871. The name was changed to Marquette in honor of the French missionary explorer of that name. Population in 1910, 11,503.

**Marriage,** *Mar' ij,* the union of a man and a woman under the relationship of husband and wife that is sanctioned by the community. Three systems of marriage exist: monogamy, in which the man can have only one wife; polygamy, in which the man can have more than one wife at the same time; and polyandry, in which the woman can have more than one husband at the same time. Polyandry exists in Tibet and some other localities in Asia, and polygamy is found in Mohammedan countries and among the native tribes of Africa, but monogamy is the only system of marriage legalized in most civilized countries.

The Catholic Church and many Protestant denominations regard marriage as a sacrament, but in most countries it is also regarded as a civil contract, although of such a nature that the contract cannot be set aside by mutual consent of the parties. In England and most other European countries, the marriage ceremony can be performed by clergymen and by those civil officers designated by law. The English custom prevails throughout the United States, though the laws in the respective states often differ in minute particulars. In most states a judge of a court of record, a justice of peace, the mayor of a city and the clerk of a county are the civil officers authorized to perform the marriage ceremony, and in all states the authority is conferred upon ordained clergymen. Nearly all states require a license which must be procured of the authority authorized to issue marriage licenses; in others, a license is not necessary. In most states two witnesses are necessary.

Infants, that is, those under legal age, cannot marry without consent of their parents or guardians. In most states this age is fixed at 18 years for women and 21 years for men. However, a marriage by parties under age without the consent of the parents is not considered void, but it is voidable. Marriages between whites and persons of negro descent are prohibited in Alabama, Arizona, Arkansas, California, Colorado, Delaware, Florida, Georgia, Idaho, Indiana, Kentucky, Louisiana, Maryland, Mississippi, Missouri, Nebraska, North Carolina, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Utah, Virginia and West Virginia. Marriages between whites and Indians are void in Arizona, North Carolina, Oregon and South Carolina; and between whites and Chinese in Arizona, California, Mississippi, Oregon and Utah. Marriage between first cousins has been forbidden in several states.

Common-law marriage, that is, the living together of a man and woman as husband and wife by mutual consent without marrying according to legal forms, is generally recognized as binding in the United States, though it is no longer so recognized in England.

The rights of married women to hold property, make contracts and transact business in their own name vary in the different states. In many states the wife can hold property, make contracts and transact business pertaining to that property the same as though she were single. In practically all states the wife secures at marriage a dower interest of one-third of her husband's estate, and real estate cannot be sold without her signature to the deed. The husband is responsible for the support of the wife and family, and desertion in most states is considered a criminal offense. See DIVORCE.

**Marryat,** *Mar' i at,* **Frederick** (1792-1848), an English sailor and novelist, born in Westminster. He ran away to sea, enjoyed lively adventures as a midshipman and won distinction for gallant service in rescuing. His novels opened up a fresh field for fiction, with their vivid scenes from the open sea, their humor and stirring escapades. Among them are *Mr. Midshipman Easy, The Phantom Ship, Masterman Ready* and *The Children of the New Forest.*

**Mars,** the planet of the solar system fourth outward from the sun. Its mean distance from the sun is 141,000,000 m.; its diameter is 4230 m.; its day is 24 h., 37 m., 22.7 s.; its year is 687 days, or nearly twice that of the earth; its rate of movement in its orbit is 899 m. per minute, or 14.99 m. per second. It has two satellites or moons, Phobos and Deimos, discovered in 1877. Deimos revolves around Mars once in a little more than a Mars day, but Phobos speeds three times around every Mars day.

At its nearest point to the earth, Mars is 35,500,000 m. distant, and, owing to the powerful telescopes used in modern observatories, its surface has became well known. When seen through the telescope, the surface presents light and dark areas. By common consent of astronomers, the light portions are considered land, and the dark, water. The so-called "canals" are dark lines connecting dark areas. The theory that these dark areas and canals are water has never been verified. Around each pole are large, white areas, which, with good reason, are believed to be ice and snow, since they decrease during summer and increase during winter at each pole. The weight of opinion is that Mars has an atmosphere containing watery vapor, but some astonomers claim that there is no atmosphere, because its presence is not revealed in the spectrum of the planet.

In many respects Mars is similar to the earth. Owing to the length of its year, the seasons are about twice as long as on the earth, and, owing to its distance from the sun, the temperature is probably somewhat lower. Its small size would make objects upon its surface weigh about one-half what they do on the earth. A person weighing 150 lb. here would weigh 75 lb. on Mars. During 1909 Mars was near the earth, and conditions were very favorable for observation. Some of the former theories were strengthened by these observations, but some of the conjectures, such as that the canals were the work of the inhabitants, failed of verification. Many reports of objects seen on Mars are without foundation, since at its nearest point Mars is 148 times farther from the earth than the moon, and objects on Mars, in order to be seen as distinctly as on the moon, would have to be 148 times as large. See PLANET; SOLAR SYSTEM.

**Mars** (in Greek, Ares), son of Jupiter and Juno, Roman god of war. His body was said to cover acres and his voice to have the volume of 10,000 men. Terror, Fear and Strife were his comrades for battle. Venus was his only love. Romulus, founder of Rome, was one of his children. Human sacrifices were sometimes offered in the temples of Mars, who was usually represented with complete armor and round shield.

**Marseillaise,** *Mar" se laze',* **The,** the French national hymn. The words and music of this inspiring song were composed in 1792 in a single night by Rouget de Lisle, a young patriotic French officer at Strassburg. The hymn received its name because it was first sung publicly by volunteers from Marseilles in July, 1792. It was suppressed by Napoleon and the Bourbons, but was heard again in 1830. It was again placed under the ban by Napoleon III, but after his fall it became the national anthem of the French.

**Marseilles,** *Mar salz',* a city of France, chief seaport of the Mediterranean, situated on the Gulf of Lyons, 219 m. s.e. of Lyons. Beyond the city to the east extends an amphitheater of hills, of which the more distant peaks are barren and rugged. Although the city was occupied by the Greeks and Romans at one time, few medieval buildings exist. Prominent features of interest include the Cathedral, the French Court House, the ancient Church of St. Victor, the exchange, the Hôtel-de-Ville, the triumphal arch of Aix and the Palais Longchamp. There are several educational institutions of note. The opening of the Suez Canal and the conquest of Algeria added to the prosperity of the city. Soap making and the manufacture of candles are leading industries. Others include the smelting of iron and copper,

building iron ships, flour milling, distilling, tanning, sugar refining and the manufacture of foods and tin goods. Greek mariners settled in Marseilles, then known as Massalia, about 600 B. C. The city was several times in the hands of invaders, but came under the dominion of the counts of Provence in the tenth century. Population in 1906, 517,498.

**Marsh,** a tract of low land on which the water stands about even with the surface. A swamp marsh is caused in a number of ways. The surface may be so nearly level that water will not flow from it until the soil has become saturated. Marshes formed in this way are common on prairies, on the flood plains of rivers and on deltas. Again, the accumulation of vegetation may cause marshes. Decaying rushes and moss and fallen leaves and branches obstruct drainage until the soil becomes saturated. Marshes are also caused by the growth of a moss from which peat is formed. Such marshes are usually called peat bogs. Salt marshes are found along the seacoast where the land is low. The most extensive marshes are found in the low plains of Siberia and Canada, where fresh water, salt water and ice combine in their formation. These marshes are known as tundra.

**Marsh, George Perkins** (1801-1882), an American diplomat and philologist, born in Woodstock, Vt., and educated at Dartmouth College. He sat in Congress from 1843 to 1849, then served as minister to Turkey till 1853, and from 1861 till his death was the first United States minister to Italy. His writings include *The Origin and History of the English Language* and *The Earth as Modified by Human Action.*

**Marsh, Othniel Charles** (1831-1899), an American paleontologist, born in Lockport, N. Y. In 1860 he graduated from Yale, where from 1866 until his death he was professor of paleontology. Meanwhile he had charge of several scientific expeditions to the Rockies and was associated with the United States Geological Survey. He discovered over 1000 new fossil Vertebrates, wrote widely and received many honors. In 1898 he presented to Yale his collections of a lifetime and his estate valued at $150,000.

**Mar'shall, John** (1755-1835), an eminent jurist, chief justice of the United States Supreme Court, born at Germantown, Va. His early education was conducted by private tutors, and at the age of 18 he began the study of law. This was soon interrupted, however, by the outbreak of the Revolutionary War, and he enlisted as lieutenant in his father's regiment, serving for six years. He resumed the study of law in 1780, and began to practice at the close of the war, quickly rising to high distinction at the bar. He served several terms in the Virginia Legislature, and was a strong advocate of the Federal Constitution in the Virginia convention, he and James Madison being largely responsible for its ratification.

Marshall declined several political appointments, but in 1797 served with Gerry and Pinckney as commissioners to France. He was elected to Congress in 1798, and was secretary of state under John Adams in 1800-1801. Adams then appointed him chief justice of the United States Supreme Court, a position which he held until his death. His decisions were of great value in establishing interpretations of the Federal Constitution. Chief Justice Marshall was a tall, angular, homespun man, but not without dignity. He was just and simple, absolutely honest, fearless in his decisions, a lawyer of prodigious learning and a judge of sound judgment—one of the world's great jurists.

**Marshall, Thomas Riley** (1854- ), an American statesman, born in Manchester, Ind., and educated at Wabash College. After studying law in Columbia City, he was admitted to the bar and began practice in 1875. During his career as a lawyer he became interested in politics, but did not hold public office until 1909, when he became governor of Indiana, as a Democrat. While governor he made a reputation as the advocate of progressive legislation. In 1912

he received the nomination for the vice-presidency at the Democratic National Convention held at Baltimore, and in the fall election, with Woodrow Wilson, won the victory by an unprecedented majority of electoral votes. Mr. Marshall is a descendant of Chief Justice Marshall and of Charles Carroll, one of the signers of the Declaration of Independence.

**Marshall, Tex.,** a city and the county seat of Harrison Co., 42 m. w. of Shreveport, La., on the Texas & Pacific, the Marshall & East Texas and other railroads. It is in a fertile farming district, of which fruits, corn, cotton and vegetables are the principal products. There is a modern street-railway system. The industrial establishments include machine shops, a foundry, an ice factory, saw and planing mills, a cannery, cottonseed-oil mills, railroad shops, carriage works and car-wheel works. Marshall also contains the largest crate and basket works in the South. The city is the seat of Wiley University (Methodist Episcopal) and Bishop College (Baptist) for negroes. Other prominent features are an opera house, city hall, a Carnegie library, Kahn Memorial Hospital and a fine courthouse. Natural gas is used for all purposes. Population in 1910, 11,452.

**Marshalltown, Iowa,** a city and the county seat of Marshall Co., about 60 m. n.e. of Des Moines, on the Chicago & North Western, the Iowa Central, the Chicago Great Western and other railroads. The city is surrounded by a stock-raising and rich farming section, of which the chief products are wheat, corn, horses, swine and neat cattle. It contains grain elevators, meat-packing plants, glucose factories, flour mills, carriage works, furniture factories, bottling works, foundries and machine shops. Here is located the Iowa Soldiers' Home, supported in part by the Federal Government. Among the educational institutions is St. Mary's Institute (Roman Catholic), a commercial and business school. Marshalltown was settled in 1860 and three years later incorporated as a town, receiving its city charter in 1868. The city was named in honor of Chief Justice John Marshall. Population in 1910, 13,374.

**Marsh Gas.** See FIRE DAMP.

**Marsh Hawk,** a bird of the Hawk and Eagle Family, known also as the harrier for its persistence in hunting its quarry. The male hawk, which measures nearly two feet in length, may be known by its bluish-gray back, white underparts, spotted with brown, grayish breast, white rump, and gray tail obscurely barred with dark gray. The female has the upper parts brown and the under parts buff with brown streaks. This handsome hawk is an inhabitant of the meadows and marshes, where it may be seen flying low over the ground in search of field Rodents. The marsh hawk does not molest poultry and is a valuable friend to the farmer. The nest, which is a foot or more in diameter, is placed on the ground or on a platform ten inches high, usually in wet meadows or swamps. It contains four to six bluish-white eggs.

**Marsh Mallow,** a coarse herb of the Mallow Family of the same genus as the hollyhock. It was once planted in gardens, but has escaped, and its large rose-colored blossoms are among the most noticeable wild flowers. The root is used for making mucilage. See MALLOW.

**Marsu"pia'lia,** an order of Mammals whose distinguishing characteristic is the possession by the female of an external pouch in which she retains the young for some time after birth. The young are born alive, but in a very immature and helpless state; they are at once transferred to the pouch, which is generally located abdominally, and are there cared for until they are able to provide for themselves. Even after they are able to find their own food, the young frequently return to the mother's pouch if surprised or frightened. The pouch is always large enough to hold the entire family. The Kangaroo, Opossum and Wombat families are members of this order. See KANGAROO; OPOSSUM; WOMBAT.

**Mar'ten,** a valuable fur-bearing animal of the Weasel Family, known in many species. The general color of the thick, soft coat is a rich brown, becoming lighter below. The body is long, the legs short and the claws sharp, as befits an animal whose home is in trees. It makes its prey of birds, squirrels and insects. The fur, when secured between November and March, is valuable, and trappers of Canada, especially in the Hudson Bay region, find great profit in it. This Canadian species is the pine marten, or Canadian sable. A European marten, having a white breast, is locally known as the beech marten or stone marten, and an American species, rare except in dense forests of Canada, where it is remarkable for its size and mischievous robbing of traps in which less cunning animals have been caught, is known as Pennant's marten or the fisher marten.

**Martial,** *Mar' shal,* **Law,** the exercise of governing power by military authorities in cases where civil and criminal law are superseded by military control. The jurisdiction under martial law is vested in a distinct tribunal, known as a court-martial, appointed by some superior officer. Martial law is not a written law, but arises out of a necessity, either in case of invasion of a foreign country by belligerents, or where, by the force of internal dissension, the regular civil authority of a country or locality is partly or wholly overcome. Under the constitutional system of the United States it is held by the Supreme Court that a state Legislature may proclaim martial law when demanded for the public safety.

**Mar'tin,** a bird of the Swallow Family. The purple martin is one of the most familiar birds on account of its acquired habit of nesting in houses provided by man. Originally the martins deposited their three to five white eggs in holes in trees, and probably do so now in remote localities. Martins may be distinguished from other swallows by their large size (eight inches), dark purple body and brown wings and tail. The female is browner, with only a gloss of purple on the head and back. Martins are valuable birds because they feed upon many kinds of injurious insects, and they should be constantly encouraged to nest about orchards and farms. In the fall they congregate in great flocks before migrating to the South.

**Martin, Homer Dodge** (1836-1897), an American landscape painter, born at Albany. He was one of the great trio of American landscape painters, holding rank with Inness and Wyant, and was a member of the National Academy of Design. While visiting in Europe he came under the influence of the Barbizon School, and he spent several years in France. His work shows a poetical interpretation of nature; his color is subdued. The Metropolitan Museum, New York, contains many of his best-known canvases, including *Lake George, Westchester Hills, A Mountain Brook, View on the Seine, Autumn on the Susquehanna* and *Trouville at Night.* The Century Club of New York possesses his *Adirondacks, Lighthouse at Honfleur* and *High Tide at Villerville.*

**Martineau,** *Mar' ti no,* **Harriet** (1802-1876), an English author, born at Norwich, England. The family professed Unitarian views. After her father's death she was forced to earn a living, and, since a growing deafness precluded her from teaching, she turned to writing. She visited America in 1834 and won unpopularity because of her decided views in favor of the abolition of slavery. After traveling on the Continent she became an invalid, but her health was restored by her undergoing a course of mesmerism. She passed from Unitarianism to agnosticism, although she never expressly and openly declared herself in favor of philosophical atheism. Her life, characterized by sincerity and industry, was ended in the peace and quiet of her tiny farm at Ambleside. She wrote *Society in America, Western Travel, Deerbrook, The Playfellow, Life in the Sick Room, Letters on Mesmerism, Eastern Life, Past and Present, History of England During the Thirty Years' Peace,*

*Letters on the Laws of Man's Nature and Development* (written together with H. G. Atkinson) and *Biographical Sketches.*

**Martineau, James** (1805-1900), an English clergyman, born at Norwich. He was educated for the ministry at the Unitarian Manchester College, graduating in 1827 and being ordained to the Presbyterian ministry the following year, in Dublin, where he began preaching. His next charge was in Liverpool, and while serving here was appointed professor of mental and moral philosophy at Manchester New College. In 1857 he took up his residence in London, whither the college had been removed in 1853, and in 1868 became its principal. He received honorary degrees from Harvard, Leyden, Edinburgh, Oxford and Dublin and ranks as one of the eminent Unitarians. He wrote, among other works, *The Rationale of Religious Inquiry, Types of Ethical Theory* and *The Seat of Authority in Religion.*

**Martinique,** *Mar" ti neek',* an island of the West Indies lying between Dominica and St. Lucia in the long chain known as Lesser Antilles. It has an area of about 380 sq. m. and is a rugged mass of volcanic rock made irregular by several groups of volcanic mountains, the highest among which is Mont Pelée. The valleys and mountain slopes are very fertile, and where not under cultivation bear forests of rank growth. There are many swiftly-flowing streams, few of which may be called rivers. The Lamentin is the only one of value for navigation. The climate is healthful and pleasant. The island produces sugar, cocoa, coffee and tobacco for export.

There are several excellent harbors protected by projecting peninsulas; the chief of these is Fort de France, which is also the capital; Le Robert, Trinité and Grande Anse are other cities of importance. Until the eruption of Mont Pelée in 1902, St. Pierre was the largest city of the island, but at that time the city with its 30,000 inhabitants was entirely destroyed. Martinique was settled in 1635 by the French, although it was among the Spanish discoveries of 1493. It was captured by the British in 1794 but became French again within a decade. Its government is administered by a governor and a general council. The island has been visited by many tornadoes and volcanic eruptions. Population, 182,100.

**Martinsburg, W. Va.,** a city and the county seat of Berkeley Co., 74 m. n.w. of Washington, D. C., on the Baltimore & Ohio, the Cumberland Valley and other railroads. It is situated in the Lower Shenandoah Valley at the base of Little North Mountain. The district is especially well adapted to fruit growing, peaches and apples being the most important crops. Valuable slate and stone quarries are worked in the vicinity and there are extensive timber tracts in the surrounding section. Among the industrial plants are railroad repair shops, wagon factories, several lumber mills, lime works, distilleries, grain elevators and manufactories of hosiery, clothing and woolen goods. The leading institutions of the city are the Berkeley Female Seminary and the King's Daughters' Hospital. The Federal Building is a fine structure, erected at a cost of $100,000. A settlement was made here previous to the War of Independence and named Martinstown, in honor of Col. Thomas Bryan Martin. In 1778 the place was incorporated. During the Civil War it was occupied by the forces of both sides. Population in 1910, 10,698.

**Martin's Ferry, Ohio,** a city of Belmont Co., nearly opposite Wheeling, W. Va., on the Ohio River and on the Wheeling & Lake Erie, the Baltimore & Ohio and the Pennsylvania railroads. It is situated in a region noted for its abundance of iron, coal and limestone. The city has large blast furnaces, glassworks, engine and machine works, tin mills, a stove foundry, box and cooperage works and shovel works. The place was incorporated as a village in 1865 and a city charter was granted in 1885. Population in 1910, 9133.

**Mar'vel, Ik,** *Ike.* See MITCHELL, DONALD GRANT.

**Marx, Karl** (1818-1883), the founder of modern socialism, born at Treves, Germany, of Jewish parents. He was educated at Bonn and Berlin, and in 1842 became editor of a Liberal paper. A year later he went to Paris in the interest of another paper, and in 1845 to Brussels; here he assisted in organizing the German Workingmen's Association which was later connected with the *Communistenbund,* for which Marx and Engels wrote their noted exposition of communism. In 1848 Marx went to Cologne and established a paper, the revolutionary character of which led to his banishment from Germany the following year. He sought to establish himself in Paris, but was forced to leave and went to London, which was thereafter his home. He became correspondent for the New York *Tribune, Putnam's Monthly* and other periodicals, some of his articles being published in pamphlet form. In 1864 Marx was instrumental in organizing the International Workingmen's Association. He died in London. See SOCIALISM.

**Mary I** (1516-1558), Queen of England, daughter of Henry VIII and Catharine of Aragon. She was declared illegal after Catharine's death, and her father even forced her to sign a declaration that he was the supreme head of the Church in England. During the reign of her brother, Edward VI, she lived in retirement. She succeeded him in July, 1553. Mary immediately restored the Catholic worship in England and did her utmost to restore the property her father had taken from the Church. Her marriage with Philip II of Spain was very unpopular, and when insurrections broke out, Princess Elizabeth was accused of conspiracy and placed in the Tower. Mary joined Philip in a war against France, by which the English lost Calais.

**Mary II** (1662-1694), Queen of Great Britain, born at St. James's Palace, London. She was the eldest daughter of James II and Anne Hyde, and was married to William, Prince of Orange, when she was only 15 years old. When her father was forced to abdicate his throne and flee she joined her husband in England, and in 1689 became with him joint ruler in Great Britain.

**Maryland,** *Mer' i land,* THE OLD LINE STATE, one of the South Atlantic States, is bounded on the n. by Pennsylvania and Delaware, on the e. by Delaware and the Atlantic Ocean, on the s. and s.w. by Virginia and on the s. and w. by West Virginia.

SIZE. The greatest length from east to west is 240 m. The greatest breadth from north to south is 125 m. The area is 12,327 sq. m., of which 2386 sq. m. are water. Maryland is about the size of Massachusetts, Connecticut and Rhode Island, and one-third the size of Indiana. It is the 41st state in area.

POPULATION. In 1910 the population was 1,295,346. From 1900 to 1910 there was a gain in population of 107,302, or 9 per cent. There are 130.3 inhabitants to the square mile and the state's rank in population is 27.

SURFACE. Chesapeake Bay divides the state into two unequal parts, generally known as the Eastern Shore and the Western Shore. The surface of the Eastern Shore is low and level, having an average elevation of about 50 ft. above tidewater. The highest point, near the head of the bay, does not exceed 100 ft. That part of the Western Shore between the bay and the Potomac River is also low, its highest point not exceeding 125 ft. West of this region the surface is undulating and contains ranges of hills varying in altitude from 300 to 700 ft. and separated by beautiful valleys. The western part of the state is crossed by the Blue Ridge and Allegheny mountains, some of whose peaks have altitudes exceeding 2400 ft. The highest elevation within the state is Backbone Mountain in Garrett County, 3700 ft. high.

RIVERS. The rivers of the Eastern Shore are short and small, and all flow into Chesapeake Bay. The most important are the Elk, the Sassafras, the Chester, the Choptank, the Nanticoke, the Wicomico and the Pocomoke. The riv-

ers of the Western Shore are larger. The chief streams are the Potomac, belonging to both Maryland and Virginia; the Gunpowder, the Patapsco, the South, the Severn and the Patuxent. The Susquehanna enters the northern part of the state before reaching Chesapeake Bay.

CLIMATE. Owing to the influence of Chesapeake Bay the greater part of the state has a mild and equable climate. The winters are short and seldom severe, and the heat of summer is tempered by sea breezes. The western part of the state is subject to more extreme changes in temperature and has longer and colder winters and hot summers. The average summer temperature for the eastern part of the state is 75°, and the average winter temperature 37°. The annual rainfall is 46 inches in the eastern part; in the western part it averages 38 inches.

MINERALS AND MINING. Valuable deposits of bituminous coal occur in Garrett, Allegany and Washington counties, and coal mining is the chief mineral industry, the output amounting to over $5,000,000 a year. Next in importance are the brick, tile and pottery industries. Kaolin and clay of excellent quality occur in large quantities in Harford and Baltimore counties. Marble, granite, gneiss, sandstone and other building stone are quarried in the counties bordering on the head of Chesapeake Bay. The white marble of Baltimore County is especially valuable for monuments and statuary. The pillars in the front of the Capitol at Washington and most of the Washington Monument are of this stone. A variegated marble of excellent quality known as Potomac marble occurs in Frederick County. There are valuable deposits of iron ore in Allegany and Garrett counties.

AGRICULTURE. Since its beginning as a colony agriculture has been the chief industry of Maryland. In colonial days tobacco was the staple crop and little else was raised. Now diversified farming is practiced and a variety of crops is grown.

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*Soil.* The soil in the Eastern Shore is a light loam, especially suited for growing garden vegetables, but along the western shore of Chesapeake Bay and in the central part of the state it is somewhat clayey and very fertile.

*Products.* Tobacco is still raised in the central part of the state. The most important field crops are wheat, corn, hay, Irish potatoes and sweet potatoes. The farms in the Eastern Shore are chiefly devoted to truck gardening and fruit growing. In the hill regions of the Western Shore dairying is an important industry, and the income from live stock is also considerable. In the Appalachian regions thousands of acres of mountain land have been planted in apple orchards, and the raising of this fruit is becoming an important industry.

FISHERIES. Chesapeake Bay has over 200 sq. m. of oyster beds, and oyster fishing is one of the important industries of the state, furnishing employment for over 7000 small vessels. The annual value of oysters taken is about $5,000,000, of which about one-half is for canned oysters (See OYSTER). The waters of the bay also abound in shad and other fish, so that the annual value of the sea food taken is somewhat over $10,000,000.

MANUFACTURES. The chief manufacturing industries are located in and about Baltimore, which is one of the leading manufacturing cities in the country. The manufacture of textiles, of clay products, including brick, tile and pottery, the canning of fruits, vegetables and oysters and other shellfish, and shipbuilding constitute the chief manufacturing industries. The production of iron and steel, making machinery, meat packing and the manufacture of tobacco products are also important.

TRANSPORTATION AND COMMERCE. The largest ocean steamers can enter the harbor of Baltimore. Chesapeake Bay also has many good harbors for vessels of lighter draught, and the Potomac is navigable as far as Washington, so that the state has excellent transportation facilities by water. There are over 1400 m.

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of railway within the state. Most of the lines are controlled by the Baltimore & Ohio and the Pennsylvania systems. Railways extend through the state in all directions, providing adequate transportation facilities. Baltimore is the chief railway center.

GOVERNMENT. The governor and the attorney-general are elected for four years and the comptroller of the treasury for two years. The treasurer is elected by the Legislature for two years. Appointments by the governor must be confirmed by the Senate. The Legislature consists of a Senate of 27 members and a House of Delegates of 101 members. Senators are elected for four years and delegates for two. One-half of the senators retire every two years. Sessions of the Legislature are biennial and limited to 90 days.

The state is divided into eight judicial circuits. In each circuit, except the one which comprises Baltimore, one chief judge and two associate judges are elected by popular vote for terms of 15 years. In Baltimore City, the eighth circuit, there are seven courts and eleven judges. The eight chief judges, one from each circuit, constitute the Court of Appeals, which is the court of last resort. Minor causes are heard by justices of the peace.

EDUCATION. The state maintains an excellent system of public instruction. Revenue is raised by general taxation, and the school fund thus secured is distributed by the state comptroller to the city of Baltimore and the counties according to the number of persons between 5 and 20 years of age. Separate schools are provided for white and colored children. Textbooks are free and the law requires nine months of school each year, but in a number of counties they are kept open for ten months. There is an efficient system of high schools receiving liberal state aid. State normal schools are maintained at Baltimore and Frostburg and there is an institution for the training of negro teachers in Prince Georges County. The higher institutions of learning not under control of the state are Johns Hopkins University at Baltimore; the University of Maryland and Goucher College at Baltimore; St. John's College at Annapolis; the agricultural college in Prince Georges County; Western Maryland College at Westminster; Washington College at Chestertown; and Jacob Tome Institute at Port Deposit. The United States Naval Academy is at Annapolis.

STATE INSTITUTIONS. The hospitals for the insane are at Sykesville, Spring Grove, Crownville and Cambridge. Schools for the blind and deaf are at Baltimore and Frederick. The school for feeble-minded children is at Owings Mills. The state penitentiary is at Baltimore. There is also a house of refuge for boys and one for girls.

CITIES. The chief cities are Annapolis, the capital; Baltimore, Cumberland, Hagerstown, Frederick, Cambridge and Salisbury.

HISTORY. Maryland, named for Henrietta Maria, Queen of Charles I, was secured from the English Crown by George Calvert, first Lord Baltimore, for himself and his heirs. It was to be a refuge for persecuted Catholics and a haven of religious forbearance. Cecilius, second Lord Baltimore, made the first settlement at St. Mary's, in 1634. Difficulties with Virginia over trading posts were not settled for almost 50 years, and then in favor of Maryland. The boundary dispute with the Penns was ended in 1767 by the establishment of Mason and Dixon's Line (See MASON AND DIXON'S LINE).

Maryland was one of the last to join the United States (1790), holding out till the large states surrendered their claims to the Western territories (See ORDINANCE OF 1787). During the first half of the 19th century, extensive internal improvements, such as canals and railroads, were made. In 1844, the first American telegraph was built from Washington to Baltimore. Though a slave state, Maryland did not secede. Of its soldiers, about 47,000 fought for the North and about 12,000 for the South. Consult William H. Browne's *Maryland* in the American Commonwealths Series.

GOVERNORS. Thomas Johnson, 1777-1779; Thomas Sim Lee, 1779-1782; William Paca, 1782-1785; William Smallwood, 1785-1788; John Eager Howard, 1788-1791; George Plater, 1791-1792; James Brice, 1792; Thomas Sim Lee, 1792-1794; John H. Stone, 1794-1797; John Henry, 1797-1798; Benjamin Ogle, 1798-1801; John Francis Mercer, 1801-1803; Robert Bowie, 1803-1806; Robert Wright, 1806-1808; James Butcher, 1808-1809; Edward Lloyd, 1809-1811; Robert Bowie, 1811-1812; Levin Winder, 1812-1815; Charles Ridgely, 1815-1818; Charles Goldsborough, 1818-1819; Samuel Sprigg, 1819-1822; Samuel Stevens, 1822-1825; Joseph Kent, 1825-1828; Daniel Martin, 1828-1829; Thomas King Carroll, 1829-1830; Daniel Martin, 1830-1831; George Howard, 1831-1833; James Thomas, 1833-1835; Thomas W. Veazey, 1835-1838; William Grason, 1838-1841; Francis Thomas, 1841-1844; Thomas G. Pratt, 1844-1847; Philip Francis Thomas, 1847-1850; Enoch Louis Lowe, 1850-1853; Thomas Watkins Ligon, 1853-1857; Thomas Holliday Hicks, 1857-1861; Augustus W. Bradford, 1861-1865; Thomas Swann, 1865-1868; Oden Bowie, 1868-1872; William Pinkney Whyte, 1872-1874; James Black Groome, 1874-1876; John Lee Carroll, 1876-1880; William T. Hamilton, 1880-1884; Robert M. McLane, 1884-1885; Henry Lloyd, 1885-1888; Elihu E. Jackson, 1888-1892; Frank Brown, 1892-1896; Lloyd Lowndes, 1896-1900; John Walter Smith, 1900-1904; Edwin Warfield, 1904-1908; Austin L. Crothers, 1908-1912; Phillips Lee Goldsborough, 1912—. Since 1876 the term for the governor has been four years.

**Maryland, University of,** at Baltimore. This institution, being gradually evolved from the Medical College of Maryland, was opened in 1807, and includes a law school opened in 1814 and reorganized in 1869, a dental department opened in 1882 and the Maryland College of Pharmacy opened in 1841. St. John's College, a nonsectarian college for men, opened in 1789 at Annapolis, became the department of arts and science in 1907. St. John's receives an appropriation of $13,000 annually from the state and gives for each county one free scholarship and one scholarship covering all expenses. It has a library of some 15,000 volumes and other properties valued at about $300,000. The college of pharmacy is the only department that admits women. The four professional schools in Baltimore report a total enrollment of 800. See JOHNS HOPKINS UNIVERSITY.

**Mary Mag'dalene,** a character of the New Testament, so named, probably, because Magdala, a village on the Sea of Galilee, was her birthplace. She is first made known to us by Luke, who names her as one of a group of Galilean women who "ministered unto the Lord of their substance." Mary had been delivered by Christ of seven devils, and she not only followed him through life, but stood by the cross at the crucifixion and was the first to look upon the risen Lord on the Resurrection morning. She was not, however, the "woman who was a sinner," mentioned in *Luke vii, 37.*

**Mary Stuart** (1542-1587), Queen of Scotland, generally known as Mary Queen of Scots. She was the daughter of James V. of Scotland. Upon the death of her husband, Francis II of France, Mary returned to Scotland, where her charm and beauty soon won for her the affection of her people. On account of her Catholic training, however, she was not welcomed by the most zealous of the Reformers, the stern John Knox making her life miserable by his severe denunciation of her. In 1565 Mary became the wife of her cousin, Lord Darnley, hoping thus to unite all Catholic claims to the English throne, as Darnley was next in succession to herself. The murder of Darnley, in which the Queen was suspected of having a part, helped to turn her people against her, and after her marriage with Bothwell, who was accused of her husband's murder, she was imprisoned and forced to abdicate in favor of her infant son. Escaping to England, she threw

herself upon the protection of her cousin, Queen Elizabeth, who placed her in prison, keeping her in confinement for 19 years. During this time Mary was the center of numerous plots to place her on the English throne, and, being finally declared guilty of complicity in one of these, she was beheaded.

**Mary, The Virgin,** the mother of Christ. She was a maid of the tribe of Judah and of the royal family of David. Joachim and Anne, according to most ancient tradition, were her parents. According to *Luke 1, 26-38,* the angel Gabriel was sent to her by God to announce that she had been chosen to be the mother of the coming Messiah. Though rarely mentioned in the Gospels, it is known that she was near her Son during all of his public work. The place of Mary's death is unknown. The Roman Catholic Church venerates her with special honor.

**Masaccio,** *Mah zaht' cho,* or **Tommaso Guidi,** *Gwe' de,* (1401-1428), one of the great pioneers in the development of Italian art. Born in Florence, he first worked in that city and afterwards in Pisa and Rome. His work was a distinct advance on all before him and was characterized by greater freedom of conception than his predecessors, greater appreciation of the value of the nude, greater mastery of perspective, better modeling of the human figure, better proportions of figures in architectural settings, and, above all, by heightened dramatic power. The most famous of his frescoes are in the Brancacci Chapel at Florence, and include *The Temptation of Adam and Eve, Peter and the Tribute-Money, The Expulsion from Eden, Peter Preaching, Peter Baptizing, Peter Almsgiving* and *Peter and John Curing the Sick.*

**Masai,** *Mah si',* an African people of Negro-Hamitic stock. They are chocolate-colored, large in stature, slim and wiry, with the nose almost Caucasian in type. Their language is like that of people living near the Nile, and they are nomadic and pastoral, wear little clothing and believe in a nature god. They spit upon people as an expression of reverence and good will.

**Mascagni,** *Mahs kahn' ye,* **Pietro** (1863- ), an Italian operatic composer, born at Leghorn. He was partly educated for the law, but discontinued his legal studies and began the study of music at the Institute Luigi Cherubini. Later he studied at the Milan Conservatory, and in 1890 appeared his *Cavalleria Rusticana,* which, with its tuneful melodies, attained wide popularity. Mascagni was for eight years director of the Pesaro Conservatory.

**Mase'field, John** (1875- ), an English poet, story-writer and dramatist, born in Shropshire. His schooling was irregular, and several years of his boyhood were spent on the sea, where, as a sailor "before the mast," he gained a thorough knowledge of the seaman's life. During these years of wandering he spent several adventurous months in New York City. After his return to England, Masefield experienced the turning point in his career in meeting the poet William Butler Yeats, who profoundly influenced him and encouraged him to write. The result was a series of stories, poems and plays that have put him in the front rank of English men of letters of the 20th century. His prose stories of the sea—*Captain Margaret, A Mainsail Haul* and *On the Spanish Main*—are not only fascinating narratives, but also vivid and accurate descriptions of sea life. His narratives in verse, including *The Everlasting Mercy, The Widow in the Bye Street, Salt Water Ballads* and *The Story of a Round House,* show him to be a poet of high order, possessed of the gift of sympathy for the humble toiler and the lowly born. As a playwright he deals with the grim facts of life with uncompromising realism, and he is a master of dramatic technique. His dramas include *The Tragedy of Nan, The Campden Wonder* and *The Tragedy of Pompey the Great.* He has also written the novels *Multitude and Solitude* and *The Street of Today;* and *Martin Hyde,* a tale for boys.

**Masho'naland"**, a province of Southern Rhodesia, South Africa, lying between the Zambesi and Sabi rivers. It is a mountainous country chiefly noted for its production of gold and other minerals. Salisbury, the chief town, is surrounded by reminders of ancient mines. The population is 497,165, about 4000 of whom are Europeans. See RHODESIA.

**Mask,** a covering for the face for protection or disguise. In the former case the mask is made of wire and is used in ball playing and fencing. Masks have been used in the rites of savages and in festivals of nearly all primitive peoples. In Greek drama, which grew out of the festival, masks were used from the beginning. Metallic mouthpieces were provided for the purpose of augmenting the power of the voice. The use of masks in the modern theater is chiefly confined to pantomime. The use of masks at costume balls is of Italian origin. Death masks are plaster impressions of the face of a person made after death.

**Ma'son, James Murray** (1798-1871), an American lawyer and legislator, born on Mason's Island, Va. In 1818 he graduated at the University of Pennsylvania, practiced law in Winchester, Va., and became a prominent figure in politics. He was a member of the United States House of Representatives from 1837 to 1839 and of the United States Senate from 1847 to 1861. In the Senate he defended slavery, was a strong advocate of states' rights and drafted the Fugitive Slave Law. In 1861 he resigned his seat in the Senate to take an active part in the Confederacy, and was sent to England to enlist her sympathies and secure help. On his way he was taken prisoner by Captain Wilkes of the United States navy, but was released upon the request of England. Mason proceeded to carry out his commission after his release, but without success. See TRENT AFFAIR.

**Mason, Lowell** (1792-1872), an American composer, born in Medfield, Mass. He early taught and composed music, and when 20 years of age went to Savannah, Ga., where he was soon leading choirs. His publication of *Boston Handel and Haydn Collection of Church Music,* in 1822, was so successful that he returned North, and in Boston, after 1827, began vocal instructions. He taught juvenile classes gratuitously according to the Pestalozzian method, founded the Boston Academy of Music, and published collections of music and glee books. He is especially remembered for his numerous hymn tunes, which are still in use.

**Mason and Dixon's Line,** the boundary line between Maryland and Pennsylvania as marked out, between 1763 and 1767, by two English surveyors, Charles Mason and Jeremiah Dixon. From the time that Pennsylvania was established in 1681, this boundary was a source of irritation until a tentative agreement was decided upon in 1732. A convention in 1760 confirmed this agreement and the two English surveyors were engaged to survey the line between the two colonies. The boundary line, at about parallel 39° 43′, was marked by milestones, and each five miles by a larger stone, on which were cut the arms of William Penn and Lord Baltimore. This line was popularly considered the dividing line between the slave and the free states until the Civil War, and is still frequently used to denote the separation line between the sections of the country known as North and South.

**Mason Bee,** a small, dark-colored bee of the group known as the solitary bees. The female alone survives the winter and begins building, in the spring, a walled nest of sticks and pebbles glued together with her own saliva. The nest consists of a series of cells, each smooth within and stored with honey and pollen, and the repository of a single egg. A layer of cement covers the entire structure, which thus forms a solid, well-built house. Unlike the honeybees and the bumblebees, the mason bees have no castes, the only classes being the ordinary ones of male and female. They are commonly found in the south of France. See BEE.

**Mason City, Iowa,** a city and the county seat of Cerro Gordo Co., 72 m. n.e. of Fort Dodge and 115 m. n.e. of Des Moines, on the Chicago & North Western, the Iowa Central, the Chicago, Milwaukee & St. Paul and other railroads. The Mason City & Clear Lake Railway, an electric line, connects the town with Clear Lake, a pleasant resort 10 m. distant. Chief among the industries are stone quarrying and the manufacture of Portland cement, brick, tile, lime, sash, doors and flour. The city has a considerable wholesale trade in groceries and fruits. At Mason City is located Memorial University, a coeducational institution, founded in 1900. There is also an Odd Fellows' Orphans' Home here. Settled in 1853, Mason City was incorporated as a town in 1870; it received its city charter in 1881. Population in 1910, 11,230.

**Masons.** See FREE MASONS.

**Massachusetts,** *Mas" a choo' sets,* THE OLD BAY STATE, one of the New England States, is bounded on the n. by New Hampshire and Vermont, on the e. by the Atlantic Ocean, on the s. by Rhode Island and Connecticut and on the w. by New York.

SIZE. The greatest length from east to west is 184 m., and the average breadth is 47 m. The total area is 8266 sq. m., of which 227 sq. m. are water. Massachusetts is about twice the size of Connecticut, the fourth New England state in area and a little larger than New Jersey. It is the fifth smallest state in the Union. There are a number of islands belonging to the state which are situated in Buzzard's Bay and Vineyard Sound. The most important of these are Nantucket, Martha's Vineyard and the Elizabeth Islands. Massachusetts Bay on the east and Buzzard's Bay on the south give the state a coast line of over 300 m.

POPULATION. In 1910 the population was 3,366,416. Between 1900 and 1910 there was a gain of 561,070 in population, or 20 per cent. There were 418.8 inhabitants to the square mile. Massachusetts is the most populous of the New England States. It ranks sixth in population in the Union.

SURFACE. The western part of the state is crossed by two parallel ranges of mountains. The eastern is the Hoosac and the western is the Taconic. These ranges are an extension of the Green Mountains and collectively are known as the Berkshire Hills. In general these mountains are low, with rounded summits and wooded slopes, and are separated by beautiful valleys.

East of these mountains and stretching almost to the center of the state is the Valley of the Connecticut. Its sides slope gradually to the river. The valley contains a number of isolated peaks, of which Mt. Tom and Mt. Holyoke are the most conspicuous. East of the Connecticut Valley is a plateau whose greatest elevation is about 1100 ft. This extends eastward with a gentle slope to meet the land forming the coast plain. The southeastern part of the state is low and marshy, but an irregular elevation of land forms Cape Cod, which encloses Massachusetts Bay. The irregular coast contains a number of good harbors, the most noted being those of Boston, New Bedford, Salem and Gloucester.

RIVERS AND LAKES. The Connecticut River crosses the central part of the state from north to south and is the largest stream within its borders. Its leading tributaries from the west are the Green, Deerfield and Westfield, and from the east, Miller's River and the Chicopee. The western part of the state is drained by the Housatonic, which flows through Connecticut and into Long Island Sound. The Merrimac crosses the northeastern part and receives the Concord and the Nashua. The Taunton, flowing into Narragansett Bay, is the most important stream in the southeastern part of the state.

Massachusetts has no large lakes, but many small bodies of water and clear ponds are found among the hills and valleys. Most of these have wooded shores, and while they are of no industrial importance they add much to the beauty of the scenery, and some of them

are valuable as sources of water supply to the neighboring cities.

Scenery. The western part of the state is picturesque and beautiful, especially in the valleys of the Connecticut, Housatonic and Deerfield rivers. From Cape Ann southward the coast line is rocky with occasional high bluffs. Along Cape Cod it is low and sandy. Nantucket, Martha's Vineyard and the Elizabeth Islands are noted summer resorts.

Climate. Along the coast the climate is variable and subject to extreme and frequent changes. In general, in this region the winters are mild, though damp, and the summers are cool, owing to the influence of the sea. Farther inland the winters are mild and the summers warm, as a rule. The average annual rainfall for the state is about 48 inches.

Minerals and Mining. Massachusetts is the leading state in the production of emerald and granite. The granite quarries are in the eastern counties. In Hampden County are valuable quarries of sandstone. Limestone is quarried in the western part of the state and clay suitable for making brick is quite generally distributed.

Agriculture. Although Massachusetts was originally an agricultural state, for many years agriculture has been second to manufactures. The farms are small and the production of milk, garden vegetables, poultry and eggs employs the attention of most of the farmers. Many cities and towns within the state furnish a ready market and the farmers receive good returns on their investments. Dairy products lead in value and amount to over $12,800,000 annually. The income from poultry is about $1,500,000. Cereal crops are not relatively important. There are some nurseries in the western part of the state. Tobacco is grown in the Connecticut Valley, and the land comprising Cape Cod is noted for its cranberries.

Fisheries. Massachusetts is one of the leading states in the production of fish. Fishermen from Gloucester, Marblehead and other coast towns search the Grand Banks for cod, which are taken in large quantities. Mackerel, halibut, herring, blue fish and other food fish are taken in large numbers off the shore. Oyster and clam fishing are also important. Gloucester is the most important fishing port in the country. Nantucket, Provincetown and New Bedford were formerly important whaling ports and whale fishing is still engaged in to some extent. At Woods Hole is one of the most complete stations of the United States Fish Commission. The fisheries of the state employ about 100,000 men and about $5,400,000 is invested in the industry.

Manufactures. Manufacturing is the leading as well as one of the oldest industries in the state. A number of the manufacturing industries which have grown to vast proportions had their beginnings in Massachusetts. The first cotton mills in the country were built at Beverly in 1788. The first power loom, constructed by F. C. Lowell of Boston and put into operation at Waltham in 1814, revolutionized the cotton industry in the entire country. The first real woolen factory was built at Byfield in 1794. The smelting of iron, the manufacture of paper and other important industries also had their beginnings in this state.

At present Massachusetts is known for the extent and variety of her manufactures. She leads in the manufacture of cotton goods, worsteds and woolens, boots and shoes, rubber shoes and writing paper, and is second only to Rhode Island and New York in the manufacture of jewelry. Railway cars, locomotives, electrical and other machinery, furniture, drugs, carpets, silks and numerous other articles are manufactured in large quantities. At Waltham is the largest watch factory in the world. Lowell, Lawrence and Fall River are the great centers for the cotton industry. Lynn and Brockton lead in the manufacture of boots and shoes and at Holyoke are some of the largest paper mills in the country.

Transportation and Commerce. Boston is the leading seaport of New Eng-

land and has direct steamship connection with all the leading ports of the world. Her coastwise trade is also extensive. The railways of the state are under the control of the New York, New Haven, & Hartford, the Boston & Maine and the New York Central systems. Lines of railway extend through the state in all directions, and every city inhabitant lives on a railway line or in close proximity to one. There are also numerous electric lines joined into systems, so that one can travel long distances on them. These lines supplement the steam railways and greatly increase the transportation facilities. The carriage roads are well cared for and in most localities are in excellent condition.

The commerce is very extensive. Manufactured products are sent to all parts of the United States and to many foreign countries. Raw material for these manufactures is imported. Foodstuffs, manufactures from foreign countries, works of art and other luxuries are also important. All these conditions make Massachusetts one of the leading commercial states in the country.

GOVERNMENT. The present government is a modification of the system instituted by the Pilgrims and Puritans. The original state constitution of 1780 has been twice revised and amendments have been made from time to time. The right of suffrage is conferred on all male citizens, 21 years of age and over, who can read and write the English language, and are neither paupers nor imbeciles. The executive department consists of the governor, lieutenant-governor, eight councilors, secretary of the commonwealth, treasurer and receiver-general, auditor of accounts and attorney-general, all elected annually by popular vote. The councilors are elected by districts.

The Legislature, called the General Court, consists of a Senate of 40 members, and a House of Representatives of 240 members, all elected annually. There are several commissions, the members of which are appointed by the governor and confirmed by the council. The most important of these are the board of agriculture, the board of education, railroad commission, the land and harbor commission, boards of health, lunacy and charity and the board of arbitration and conciliation, whose duties are to deal with labor disputes.

The judicial department comprises a Supreme Court consisting of a chief justice and six associate justices, and a Superior Court consisting of a chief justice and 22 associates. All these judges are appointed by the governor and confirmed by the council. The judges of these courts hold court in the various counties. Each county also has its courts of probate and insolvency, and cities have such police and municipal courts as they require.

EDUCATION. The first public schools in the United States were established in Massachusetts by a colonial law enacted in 1647. The first college in the country was founded in Cambridge in 1636 (See HARVARD UNIVERSITY). From the earliest times to the present day Massachusetts has given special attention to public education, and her school system in extent, completeness and efficiency is second to none.

The state board of education has advisory powers, and through its commissioner, who has the duties and authority of a state superintendent of public instruction, maintains general supervision over the school system. The law requires a public school to be maintained in every city and town. These schools are under the control of local boards. The minimum course of study is defined by law and the schools as a rule are carefully graded and furnished with complete equipment. Attendance is compulsory between the ages of seven and fourteen. Outside of the larger cities the schools are grouped into supervisory districts, and each district is in charge of a district superintendent. The state maintains ten normal schools for the training of teachers and a number of schools for training in the industrial arts and the trades.

The most important higher institutions of learning are Harvard University, Mas-

sachusetts Institute of Technology, Amherst College, Williams College, Worcester Polytechnic Institute, Clark University, Boston University, Tufts College and Holy Cross College. The following colleges for women are also important: Mt. Holyoke, Wellesley, Smith, Radcliffe and Simmons.

STATE INSTITUTIONS. The schools for the instruction of the deaf are at Boston, Northampton and Randolph. There is a school for the feeble-minded at Waltham. The Massachusetts School for the Blind and Perkins Institute is at Boston. The hospitals for the insane are at Danvers, Medford, Northampton, Taunton, Westborough and Worcester. The state prison is at Boston and the reformatory for men is at Concord. The reformatory for women is at Sherman.

CITIES. The chief cities are Boston, the capital; Worcester, Fall River, Lowell, Cambridge, Lynn, Lawrence, New Bedford, Springfield, Haverhill, Gloucester, Somerville, Holyoke and Brockton.

HISTORY. Massachusetts, from an Algonquin phrase meaning "at the great hill," was, according to Icelandic Sagas, visited by Norsemen about 1000. The Cabots sailed along the coast in 1497. Gosnold made a brief settlement, on one of the Elizabeth Islands, in 1602. Twelve years later, John Smith made a map of the coast. The first permanent settlement, at Plymouth, 1620, was made by English Separatists who for 12 years had been self-exiled in Holland (See PLYMOUTH COLONY). In 1628 John Endicott settled Salem, which with Boston, established in 1630, and various other villages, later constituted Massachusetts Bay Colony. Some of the leaders of this colony were among the most conspicuous characters of early American history (See ENDICOTT, JOHN; WINTHROP, JOHN; DUDLEY, THOMAS). Its religious intolerance, however, drove into exile Roger Williams, Anne Hutchinson and John Wheelright. Quakers likewise were banished, and later 20 supposed witches were put to death at Salem. A long series of Indian wars, from 1637 to 1760, caused great suffering. In 1692, the Province of Massachusetts Bay in New England was granted a new province charter. For further details of early Massachusetts history, see NEW ENGLAND CONFEDERATION; PHILIP, KING; WITCHCRAFT.

During the next century, despite troubles with the French and Indians (See FRENCH AND INDIAN WARS), struggles with the Crown over the charter, and boundary disputes with neighboring colonies, Massachusetts grew rapidly in population and in commercial and military power. It led in the pre-Revolutionary struggle. Its valorous soldiers and diplomatic statesmen contributed much to the successful issue of the war: Massachusetts furnished over one-fourth of the American troops, and it was the scene of many of the most important events of the early struggle (See BOSTON MASSACRE; BOSTON TEA PARTY; LEXINGTON, BATTLE OF; BUNKER HILL, BATTLE OF). The first state constitution, 1780, abolished slavery. The crushing taxes necessitated by the Revolution led to Shays's Rebellion, 1786 (See SHAYS'S REBELLION). By a small majority, Massachusetts ratified the Constitution (January, 1788). It was strongly Anti-Federalist till 1797. The state was closely associated with the Hartford Convention. Leaders of the anti-slavery movement, among them Garrison, Phillips and Sumner, came from Massachusetts, which furnished the Federal army nearly 160,000 men. Since the Civil War, the state has dealt with reforms regarding education, prohibition and labor legislation. Consult C. F. Adams, *Massachusetts: Its Historians and Its History.*

GOVERNORS. John Hancock, 1780-1785; James Bowdoin, 1785-1787; John Hancock, 1787-1793; Samuel Adams, 1793-1797; Increase Sumner, 1797-1799; Moses Gill, 1799-1800; Caleb Strong, 1800-1807; James Sullivan, 1807-1808; Levi Lincoln, 1808-1809; Christopher Gore, 1809-1810; Elbridge Gerry, 1810-1812; Caleb Strong, 1812-1816; John Brooks, 1816-1823; William Eustis, 1823-1825; Levi Lincoln, 1825-1834; John Davis, 1834-1835; Edward Everett, 1836-

1840; Marcus Morton, 1840-1841; John Davis, 1841-1843; Marcus Morton, 1843-1844; George N. Briggs, 1844-1851; George S. Boutwell, 1851-1853; John H. Clifford, 1853-1854; Emory Washburn, 1854-1855; Henry J. Gardner, 1855-1858; Nathaniel P. Banks, 1858-1861; John A. Andrew, 1861-1866; Alexander H. Bullock, 1866-1869; William Claflin, 1869-1872; William B. Washburn, 1872-1874; Thomas Talbot, 1874-1875; William Gaston, 1875-1876; Alexander H. Rice, 1876-1879; Thomas Talbot, 1879-1880; John Davis Long, 1880-1883; Benjamin F. Butler, 1883-1884; George D. Robinson, 1884-1887; Oliver Ames, 1887-1890; John Q. A. Brackett, 1890-1891; William E. Russell, 1891-1894; Frederic T. Greenhalge, 1894-1896; Roger Wolcott, 1896-1897; Roger Wolcott, 1897-1900; W. Murray Crane, 1900-1903; John L. Bates, 1903-1905; William L. Douglas, 1905-1906; Curtis L. Guild, 1906-1909; Eben S. Draper, 1909-1911; Eugene N. Foss, 1911-1914; David I. Walsh, 1914—. John A. Andrew was a "war governor."

**Massachusetts Bay,** an indentation of the eastern coast of Massachusetts, extending 42 m. in length from Cape Ann to Plymouth Harbor, with a breadth inland, opposite Boston, of 22 m. Often the name is made to include Cape Cod Bay. There are several smaller bays, forming the important harbors of Boston, Lynn, Salem, Gloucester and Marblehead. The shores are irregular; the southern, sandy and marshy; the northern, rocky.

**Massachusetts Bay Colony,** a settlement established by 60 English Puritans under the leadership of John Endicott at the present site of Salem, Mass., in 1628. The Council of New England had previously granted to Endicott and others a strip of land from the Atlantic to the Pacific, from three miles north of the Merrimac to three miles south of the Charles. From the first the colony was independent of England in the management of its own affairs, being empowered to elect its governor, deputy-governor and 18 assistants, and to make any rules "not repugnant to the laws of England." However, authority was not formally changed to America until 1630. The colony grew rapidly, but sickness, dissension and mismanagement later caused great suffering. As a result of religious persecution, the most vigorous in American history, many of the most prominent members of the colony left and established settlements in New Hampshire, Rhode Island and Connecticut.

**Massachusetts Institute of Technology,** at Boston (1861). Opened for students in 1865, this institute has won an international reputation, and 40 per cent of its students come from other states. Its aim has been to fix in the students' minds by laboratory experiments, which they themselves perform, the important laws of science brought out in the classroom; and to develop each individual so that he shall seek knowledge for its own sake, and become less and less dependent upon his instructors. In many phases of technical education, it has done the pioneer work of the country. It has a graduate school, offers some summer courses, and enrolls a few young women. It is nonsectarian. The library contains about 100,000 bound volumes and twice as many pamphlets. The endowment is about $2,000,000. There are some 1500 students and about 3000 graduates. The Massachusetts Institute of Technology has purchased about 57 acres of land in Cambridge, bordering on the Charles River basin, for the purpose of erecting new buildings.

**Massage,** *Ma sahj'*, a form of treatment which consists in rubbing or kneading the body to stimulate circulation and so remove waste tissue. It is practiced by educated operators who must understand the anatomy of the nerves and muscles. Treatments are said to have quieting effect upon the nerves and remedial or hygienic effect upon the skin and upon the system in general. A practitioner is called a masseur or masseuse.

**Massasoit,** *Mas' a soit"*, (about 1580-1661), an American Indian chief, born

in Massachusetts. He was sachem of the Wampanoags, who occupied the southern part of Massachusetts. This tribe was reduced by a scourge from 30,000 to 300. Soon after the founding of Plymouth Colony, Massasoit, accompanied by 60 of his warriors, visited the colony and concluded a treaty of peace with Governor Carver which lasted for 50 years. Massasoit was a man of just and kindly nature, a lover and teacher of peace.

**Mas'sillon, Ohio,** a city of Stark Co., 9 m. w. of Canton and 69 m. s. of Cleveland, on the Tuscarawas River and the Ohio Canal and on the Baltimore & Ohio, the Pennsylvania and the Wheeling & Lake Erie railroads. There is a large trade in coal, sandstone, live stock and grain. The industrial plants produce stationary and portable engines, iron bridges, bar iron, pumps, sash and blinds, furnaces, glass bottles, steel tubing, flour, pottery, foundry and machine-shop products, farm implements and creamery products. Massillon is the seat of the state hospital and asylum for the insane. There are many fine public buildings. It was founded in 1825, incorporated as a village in 1853 and chartered as a city in 1868. Population in 1910, 13,879.

**Mas'tersing"er** (German, *Meistersinger*), a member of the society of German singers established at the end of the 13th century. The institution originated in the assembling of the burghers, who used to meet on winter evenings to read the poems of the minstrels. Some of the hearers began to compose verses of their own, others followed their example and before long a legalized corporation was established. Charles IV (1346-1378) gave them a charter. They held their meetings on certain days, when they criticized each other's productions in accordance with a formal set of rules. Unlike the minnesingers, whose poetry was mainly chivalric in character, the mastersingers wrote spiritual songs or rhymed versions of Scriptural stories. Correctness was the chief end to be attained. These societies flourished especially in the 14th and 15th centuries and continued in Nuremberg to the 18th century. The last society to be dissolved was that of Ulm, which held its final meeting in 1839. The greatest of the mastersingers was Hans Sachs, who lived in the 16th century.

**Mas'tiff,** a class of dogs, which includes such breeds as the bulldog, boarhound, great Dane, bull terrier and pug. All are strong and solidly built, with powerful shoulders, short, sleek coats and thin tails. The head has a muzzle of moderate or short length, drooping ears, protruding lower jaw and a sagging upper lip. They are excellent watchdogs and are faithful to death to a trust. Many stories are told of their sagacity in caring for children and in protecting their master's property from theft and fire; some are trained in the care of flocks and are said to rival shepherd dogs in this regard.

**Mas'todon,** a name applied to an extinct genus of elephant, remains of which are found in all parts of the world in Tertiary formations from the Niocene into the Pleistocene period. It is the oldest and most primitive type of the Elephant Family. In general structure it closely resembled the Asiatic elephant of today and the average size was nearly the same as that of the modern elephant, though the body may have been bulkier. The body was protected with fur; the tusks curved upward and back, sometimes occurring in both jaws. The teeth were of different structure and the forehead was flatter. The animal fed on herbage, bark and leaves.

**Match'es,** small splints of wood, coated at one end with an inflammable mixture, which ignites by friction. It is estimated that the civilized people use 3,000,000 matches every minute of the day of 24 hours. About one-half of this vast number is used in the United States. If we estimate the population of the country at 100,000,000, this gives an average of 22 matches a minute for every man, woman and child. In a single year the match industry cut 225,000,000 ft. (board measure of timber) from the

Great Lakes region. One of the great match plants consumes about 200,000 ft. of lumber a day, and the census of 1910 gave the annual value of matches made in the United States at $11,353,000.

Manufacture. The splints are made of soft wood, usually pine or basswood, and the best grade of lumber, free from knots, is necessary. In the American match factory all the work, except placing the matches in boxes, is done by machinery. Basswood splints are made from veneer, which is a shaving just the thickness of the match. The logs are cut into sections five feet long. These are steamed to soften them, then placed in a lathe and cut into veneer, which is a long, thin sheet of wood. This sheet is cut into splints the size of a match, which are then dried and dropped into a shaker that arranges them in line side by side. They are then placed in the stacking machine, which is a perforated plate moving on an endless chain. One end of the splint is inserted in the perforations, and as the plate moves along, the other end is dipped first in paraffin, then in the other mixtures, which make the head of the match. The plates are then placed where the heads can dry.

A more recent method, requiring pine lumber, employs an automatic machine, which of itself practically converts the lumber into matches. The lumber for use in this machine is sawed into two-inch planks, which are then cut into sections the length of a match. These sections are fed into the machine at one end, and the finished matches are turned out at the other at the rate of 720,000 an hour, or 12,000 per minute, when they are placed in match boxes. This machine requires seven operators, five of whom are employed in packing the matches into boxes.

History. According to the best authorities, the friction match was invented by John Walker of England in 1829. Others, however, claim that friction matches were made in the United States by Joseph and Jacob Miller in 1825. The first matches of this sort contained a mixture of sulphur and phosphorus. Later chlorate of potash took the place of sulphur. Safety matches, which can be ignited only by rubbing them on a prepared surface, are of more recent origin. The principle of this match is that some of the ingredients necessary for ignition are in the head of the match and the others in the coating on the side of the box. The manufacture of ordinary phosphorus matches is one of the most dangerous of occupations, because the phosphorus poisons the workman and produces incurable diseases. In 1912 the United States Government enacted a law prohibiting the manufacture of these matches in the country. Their manufacture has also been prohibited in most European countries.

**Maté,** *Mah' ta,* or **Paraguay,** *Pair' a gwa,* **Tea,** an evergreen shrub of the Holly Family extensively used in South America in the place of tea. The shrub grows to the height of a small tree and bears smooth, shiny leaves and small, almost stemless, white flowers. The tea is prepared from the dry leaves and shoots, but is frequently adulterated with the leaves of other plants and is rarely sold pure. The drink is made in nearly the same manner as ordinary tea and is generally drunk from a bowl or gourd, called a maté, by means of a tube provided with a metal strainer. The name of the dish came later to be applied to the drink. Maté is unpleasant to the uninitiated, but is used in large quantities in Brazil. It contains the same principle, caffein, as tea and coffee, and has the same invigorating effect. It is produced chiefly in Paraguay. A related North American species, called cassena tea, was once similarly used by the Creek Indians.

**Mate'rialism** (from Latin *materia,* matter), in philosophy, the doctrine that explains the universe in terms of matter and motion. It is opposed both to natural realism and to idealism, the former of which occupies the "common sense" position that minds and material objects both have valid existence; while the latter makes matter a corollary of mind. Materialism, on the other hand, reduces all mental processes to physical

changes in the nervous system. While natural science is not necessarily allied with materialism, it is easy to see how the almost exclusive occupation of science with the facts of nature, and its attempts to explain phenomena by natural causes, constitute a temptation in that direction. The chief periods when materialism has been especially influential are the Pre-Socratic and Post-Aristotelian in Greece, the 18th century in France and the third quarter of the 19th century in Germany. In English thought, materialism has been more uniformly influential from Hobbes to the present time. Even when materialism is not held in an absolute form, it still may color thinking by the subordination of mental and spiritual to material phenomena and interests. See PHILOSOPHY; IDEALISM; REALISM.

**Math"emat'ics,** that branch of science which has to do with the relations of magnitudes and numbers. At present it is understood as including two great departments: pure mathematics, or subjects which take up the mechanical operations with abstract numbers; and applied mathematics, or those subjects which apply the operations of pure mathematics to practical problems. The first class includes arithmetic, algebra, geometry, trigonometry, calculus and analytic geometry; applied mathematics is best represented in mechanics, physics, geodesy and astronomy. As with all sciences, no hard and fast line can be drawn between the two divisions, since they are closely related, and the modern tendency is to make use chiefly of those principles of pure mathematics which find practical application.

The branches of pure mathematics were first developed, and they began when the science of numbers was studied. The earliest mathematical records are those of the Egyptians, who seemed to have a well-developed numerical system and a system of fractions, though a complicated one, before 2000 B. C. Mensuration, both arithmetical and geometrical, had, of necessity, also been developed. Later the science seems to have advanced more as an applied science, and spread to the Babylonians and Phœnicians, who made use of it in their trade relations. In Greece, about 600 B. C., is probably to be found the real beginning of pure mathematics as a science. In the schools of Pythagoras, Hippocrates, Plato, Euclid and Archimedes mathematics and philosophy occupied the prominent places, and as the two developed together, mathematics became more than ever a science of reason; at the same time a geometry, differing little from that of the present, was also developed. A little later Persia, Arabia and India produced works in mathematics, among which is an especially well-written book on algebra, by Omar Khayyám, who is less known as a scientist than as a poet.

In Europe, Italy, always the patron of arts and sciences, gave much attention to arithmetic and algebra, and with the aid of French scholars, as Descartes, brought those two departments into their present form. Descartes also presented his analytical geometry, while other mathematicians, both French and German, were computing tables of logarithms and studying geometry with renewed zeal. The greatest addition to mathematical study since that time was the simultaneous announcement by Leibnitz, in Germany, and Newton, in England, of the invention of calculus. Since their time mathematical study has advanced mainly through the study of the fundamental principles laid down by the founders of the science, and an expansion of these along practical and theoretical lines.

**Math'er, Cotton** (1663-1728), an American divine and writer, eldest son of Increase Mather, born in Boston. He graduated at Harvard in 1678, and was ordained at Boston. A restless, credulous, praise-loving man, he was interested in strange phenomena, and outstripped everyone in fanning popular belief in witchcraft (See WITCHCRAFT). His works include the *Magnalia,* a Church history of New England from 1620 to 1698, valued chiefly today for the insight it gives into the intellectual

life of its author; *Essays to Do Good; Parentator,* a life of his father; and a number of books on witchcraft. At his death, Cotton Mather was considered the foremost scholar and writer that America had thus far produced.

**Mather, Increase** (1639-1723), a colonial minister, born at Dorchester, Mass., and educated at Harvard and at Trinity College, Dublin. He became pastor of the new North Church at Boston in 1664, and in 1685 became president of Harvard, though still retaining his pastorship. He resigned the presidency in 1701. He was active in opposing the tyranny of Charles II and James II and obtained a new charter for the colony from William III, which proved satisfactory. He was a prolific writer and published a large number of works.

**Math'ews, Shailer** (1863- ), an American educator and editor, dean of the Divinity School of the University of Chicago, born at Portland, Me. He was educated at Colby College, Newton Theological Institution and the University of Berlin. Since 1894 he has been connected with the University of Chicago, as associate professor (1894-97) and professor (1897-1905) of New Testament history and interpretation, and as professor of historical and comparative theology since 1906. From 1899 to 1908 he was junior dean of the Divinity School, and became dean in 1908. He was editor of *The World To-Day* from 1903 to 1911. In 1913 he was elected president of the Federal Council of the Churches of Christ. Among his writings are *The Social Teaching of Jesus, A History of New Testament Times in Palestine, The Messianic Hope in the New Testament, The Church and the Changing Order* and *The Gospel and the Modern Man.*

**Matter,** that which occupies space and which we can detect by one or more of our bodily senses. The so-called luminiferous ether, which is supposed to pervade all space, even to some extent that occupied by common matter, is not included in the above definition of matter; it may be a form of matter but it has never been perceived by the bodily senses. Matter exists in one of three general states, solid, liquid and gaseous; but they are not always distinct from each other. See VAPOR; GAS; ELASTICITY.

**Matterhorn,** *Maht' er horn,* a mountain of the Pennine Alps, located between the Canton of Valais and the Val d'Aosta in Italy. It is 14,780 ft. in height, and rises impressively and abruptly far above the surrounding range. Since 1865, when Whymper, Hudson and Lord Douglas ascended it, it has no longer offered the former dangers of ascent. A hut for shelter has been erected at a height of 12,526 ft. In 1891 a mountain railway was opened which carries passengers to an altitude of over 5000 ft. This has since been extended by an electric railway extending to an altitude of 10,290 ft. and forming the highest electric railway in the world. The power is generated by a mountain stream formed by the melting of the Findalen Glacier. Each train can carry 110 people.

**Matthews, (James) Brander** (1852- ), an American author and educator, born in New Orleans, La. He graduated at Columbia College in 1871 and from the Columbia Law School two years later, and was made professor in the same university in 1892. He became secretary of the Simplified Spelling Board in 1906. His writings include dramatic criticism (French in tone), comedies (literary, rather than dramatic) and short stories. He was one of the founders of the Authors Club and of The Players, assisted in organizing the American Copyright League and has been a member of the American Academy of Arts and Letters. Among his works are *French Dramatists of the Nineteenth Century, Americanisms and Briticisms, Aspects of Fiction, Introduction to the Study of American Literature, His Father's Son, Vignettes of Manhattan, Studies of the Stage, Margery's Lovers, Recreations of an Anthologist, Development of the Drama* and *A Study of the Drama.*

**Matthews, Stanley** (1824-1889), an American jurist, born in Cincinnati, Ohio. After graduating at Kenyon College in 1840, he was admitted to the bar and practiced law in Cincinnati. He served successively as county judge, state senator and United States attorney for southern Ohio (1858-61). From 1861 to 1863 he was in the Union army, after which he became judge of the Cincinnati Superior Court. In 1877 he succeeded John Sherman as United States senator, and in 1881 was appointed associate justice of the United States Supreme Court, holding this position until his death.

**Matthew,** *Math' u,* **Saint,** one of the Twelve Apostles of Christ, the author of the first book of the New Testament (See GOSPELS, THE). He was the son of Alpheus, and before his conversion was named Levi. His office was that of a publican, or officer of the Roman customs. Of his history after his call to be an apostle, we know very little. In *Acts i, 13,* we learn that he was one of those assembled in the "upper room" at Jerusalem after the Ascension; tradition makes him a preacher in that city for 15 years and a missionary to Arabia, Ethiopia, Macedonia and other places.

**Mattoon', Ill.,** a city of Coles Co., 12 m. s.e. of Peoria and 56 m. w. of Terre Haute, Ind., on the Illinois Central, the Cleveland, Cincinnati, Chicago & St. Louis and other railroads. There is a good trade in broom corn, grain, fruit and live stock. Chief among the industrial establishments are railroad repair shops, broom factories, carriage and wagon works, flour mills, grain elevators and hay presses. The town has a Carnegie public library and reading room and the Old Folks' Home of the I. O. O. F. Mattoon was settled and incorporated in 1855 and is governed under a revised charter of 1867. Population in 1910, 11,456.

**Maumee' River,** a river of the United States formed at Fort Wayne, Ind., by the junction of the St. Mary's and St. Joseph's rivers. It flows in a northeasterly direction into Ohio and enters Lake Erie through Maumee Bay. It is 150 m. long and navigable to Maumee Rapids, a distance of 12 m. The Miami and Erie Canal, which connects Lake Erie with the Ohio River, begins at the head of navigation. Toledo is at the mouth of the river.

**Mau'na Lo'a,** the largest volcano in the world, occupying a large part of the central and southern portion of Hawaii. It rises gradually from the sea to a height of 13,760 ft., terminating in a group of craters, which together form an enormous caldron a mile and a half in diameter and 1000 ft. in depth. The volcano is almost continuously active and violent eruptions are of frequent occurrence. Its discharge of lava is greater than that of any other volcano in existence. During the eruption of 1880-81 a stream was emitted which in places reached a width of three miles, and had an extent of 50 miles.

**Maupassant,** *Mo" pa" sahn',* **Henri René Albert Guy de** (1850-1893), a French novelist and poet born at the Château of Miromesnil. He studied at Yvetot and at Rouen, and was later clerk in the cabinet of public instruction, where it is said that his style was declared unsatisfactory. Maupassant's first productions attracted the attention of the novelist Flaubert, to whom the young writer served a severe seven years' term of apprenticeship. Then followed the publication of the works which won for him the rank of master of the short story. In style, power of observation and marvelous insight he has remained unequaled among the French naturalists. Peasants and servants are his favorite types. His works include *Mademoiselle Fifi, A Life, Tales of Day and Night, Father Milon, Pierre and Jean* and *Yvette.* A translation of 13 of his best short stories has been published under the title *The Odd Number.* It includes the stories, admirable for their construction and insight into human character, *The Diamond Necklace* and *A Piece of String.*

**Mauritius,** *Mo rish' i us,* once called Ile de France, an island of the Indian

Ocean lying 530 m. e. of Madagascar. It has an area of 720 sq. m. and in physical features is a mountainous island surrounded by coral reefs. The Black River Peak and Pieter Botte, a peculiar isolated rock, are the highest peaks and have an altitude of nearly 3000 ft. Along the coast there are fertile plains where fruits, sugar cane, rice, maize, manioc, coffee, pepper and vegetables are grown. The native trees are chiefly tropical. The chief industries are the manufacture of sugar, rum and drugs and the preparation of fiber for cloth making. Port Louis is the capital and largest city. It has been a British possession since 1810. The island is famous as being the scene of Saint-Pierre's *Paul and Virginia*. The population is 375,400, about 30,000 of whom are Indian and the rest of French or mixed descent.

**Maury,** *Mor' y,* **Matthew Fontaine** (1806-1873), an American naval officer and hydrographer, born in Spottsylvania County, Va. In 1825 he entered the navy, but an accident in 1839 made him a cripple, whereupon he entered scientific work at the Washington Observatory, of which he became superintendent. In addition to papers on the Gulf Stream, ocean currents and great circle sailing, he wrote a valuable *Physical Geography of the Sea*. He became commodore in the Confederate service of the Civil War, later went to Mexico, Russia and England, taught physics at Virginia Military Institute and was president of Alabama University.

**Mavor, James** (1854- ), a distinguished educator, born in Scotland and educated at Glasgow University. In 1892 he was called to the University of Toronto. Since then he has investigated European labor colony systems and immigration and has inquired into the Workmen's Compensation Acts in Europe, into the municipal administration of the United States and into Canada's capacity as a producer of wheat and her facilities for transporting it. He also conducted the negotiations which led to the Fisher Copyright Act of 1900. Professor Mavor has written widely on social and economic topics, and on the subjects of relief of the poor and of railway administration, he ranks among the most eminent of English authorities.

**Max Adeler.** See CLARK, CHARLES HEBER.

**Max'im, Hiram Stevens** (1840- ), an American inventor, born in Maine. He is the originator of the firearms that bear his name. His first gun was loaded and fired automatically by means of power secured from its own recoil. A gun was finally perfected that fired 600 shots per minute. Maxim has succeeded so well that his guns are now used more or less by every civilized nation. He also invented searchlights, an incandescent light and a smokeless powder. He was knighted in 1901 and became a citizen of England. He has received many decorations and is a member of several scientific societies.

**Maxim, Hudson** (1853- ), an American inventor and engineer, born in Maine. In 1888 he took up the business of ordnance and explosives, and was the first to make smokeless powder in the United States, developing the Maxim-Schupphaus smokeless powder adopted by the government. His other inventions include "maximite," the first high explosive to be fired through heavy armor plate; "stabillite," a smokeless powder of superior ballistic results; "motorite," a self-combustible for driving automobile torpedoes; and a torpedo ram. He is a member of various scientific organizations. See TORPEDO.

**Max"imil'ian** (1832-1867), Archduke of Austria and Emperor of Mexico. He served in the Austrian navy and in 1857-9 was viceroy of the Lombardo-Venetian Kingdom. In 1864 he accepted the crown of Mexico. In spite of his wise efforts to develop and consolidate his dominions he failed to preserve order. The French troops, sent by Napoleon to support the Emperor, were withdrawn because of the protest of the United States Government. Maximilian made a brave effort to maintain his position, but was betrayed, tried by court-martial and shot.

**Maximilian I** (1459-1519), Holy Roman emperor, born at Wiener-Neustadt, near Vienna. He married Mary, daughter of Charles the Bold of Burgundy, an alliance which secured him greater wealth and influence. In 1493 he succeeded his father, Frederick III, as emperor. He checked the private wars that had wasted the country during his father's reign, and organized Germany into ten circles, each governed by a captain and force of soldiers, for the preservation of the peace. He also did much to advance the interests of art and education generally. He sought to extend his empire, in which endeavor he was more successful by diplomacy than by war. Maximilian was the greatest of the Hapsburg line during the medieval period.

**Max Müller,** *Mil' er,* **Friedrich** (1823-1900), a German philologist and Orientalist, born at Dessau. His father was one of the great German poets, Wilhelm Müller. At Leipsic, Berlin and Paris, respectively, Friedrich studied Sanskrit, philology and the science of comparative religion. In 1846 he came to England to edit the *Rigveda,* under the patronage of the East India Company, settling in 1848 at Oxford, where the work was printed. He was appointed deputy professor of modern languages at Oxford in 1850 and was made master of arts the next year. During his years of residence here he gained an extended reputation as a comparative philologist and Orientalist, and in 1868 was made professor of comparative philology on the establishment of that chair. He has written many valuable books, among which are *History of Ancient Sanskrit Literature, Origin and Growth of Religion, The Science of Religion* and *Natural Religion.* He is a recognized authority on the sacred literature of the East.

**Max O'Rell'.** See BLOUET, *Bloo" eh',* PAUL.

**Max'well, William Henry** (1852- ), an American educator, born in Ireland. He graduated from Queen's University, Galway, in 1872, and taught in the Royal Belfast Academical Institution and in the Ladies' Collegiate Institution of that city. Coming to America in 1874, he engaged in journalistic work on the New York *Tribune* and the *Herald,* and for five years was managing editor of the Brooklyn *Times,* serving meanwhile as a lecturer on history and civil government in the evening high schools. Elected associate superintendent of the public schools of Brooklyn in 1882, he became superintendent in 1887; and since 1898 has been superintendent of the schools of Greater New York. Dr. Maxwell is the author of several English texts for schools, and of numerous articles on educational subjects.

**May,** the fifth month of the year, containing 31 days. The word is from a Latin root meaning greater, referring to the growth of vegetation during the month, but some say referring to the older men who were honored on this day among the Romans; and others refer it to Maia, the mother of Mercury. It has always been a month of festivities among all peoples. The practice in England during the Middle Ages of going to the woods for flowers and hawthorn (the may) was called "going-a-maying." The doors and windows of the houses were decorated, and the people danced around the Maypole. See MONTH; YEAR.

**May, Phil** (1864-1903), an English comic newspaper artist. When 15 he entered an architect's office, which he soon left to join a troupe of strolling actors, for whom he made comic portraits for advertising purposes. Thus awakened to his talent, he went to London, where he contributed to the *St. Stephen's Review.* Later he was on the staffs of the *Sydney* (Australia) *Bulletin,* the London *Graphic* and *Punch.* An excellent draughtsman, his boy sketches in the slums were especially admirable. *Phil May's Sketch Books* and *Phil May's Annual* contain his best work.

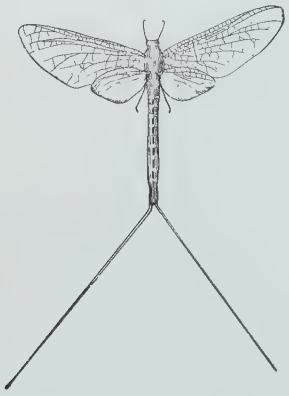
**May Apple.** See MAN'DRAKE.

**May Beetle.** See JUNE BUG.

**Mayflower Compact,** the agreement made on Nov. 11, 1620, in the cabin of

the *Mayflower,* in Provincetown Harbor, by the Pilgrim Fathers. Before landing, they vowed themselves a "civil body politic" and pledged obedience to the laws which they should make as such. See PILGRIMS.

**May Fly, Lake Fly** or **Shad Fly,** an insect of the order known as Ephemerida. There are several different species, members of which are abundantly found upon the shores of lakes, large rivers and streams, where, at twilight, they dance about, especially near artificial lights, and cling closely to the clothing of boaters. May flies are rarely found inland, unless blown from their usual haunts. At twilight the May fly emerges from the water, where it has



MAY FLY

existed in the larval stage, crawls up the bank, splits its skin and comes forth a dancing, winged creature, whose life is generally ended before the dawning of the next day. This brief, adult existence has, however, been preceded by two or three years of larval life in the bed of the stream. There the May fly larva is a wingless, aquatic animal which crawls about under stones in search of food. In this stage it is called a nymph and has a soft, six-legged body. During its months under water, it grows rapidly, develops its wings underneath an enveloping skin and molts in some instances a score of times. Unlike any other insect, the May fly molts after it has spread its wings; this occurs from 1 to 24 hours after its first appearance above the surface.

The adult May fly is frail, with a pair of large, gauzy forewings and a comparatively small pair of hind ones. Sometimes this last pair is entirely wanting. The most striking characteristics are two or three long, slender filaments extending from the abdomen, and the large compound eyes upon the head. The mouth is rudimentary or entirely lacking, for in its brief adult existence, it does not eat at all. See INSECTA.

**Mazarin,** *Maz" a reen',* **Jules** (1602-1661), a cardinal and the eminent minister of Louis XIV. He was born in Italy, educated at Rome by the Jesuits and appointed nuncio to France in 1634. Richelieu recognized his ability and offered him service for the King. He later became a naturalized citizen of France and was made a cardinal in 1641. The next year he succeeded Richelieu as prime minister. When Louis XIII died, his wife, Anne of Austria, retained Mazarin. He was unpopular with the people and hated by the nobles, and those two classes joined in the civil war, called the Fronde. Mazarin fled from the court, but returned in 1653, and for the next eight years remained ruler of France. His foreign policy was like that of Richelieu; he gained the alliance of Cromwell and brought the provinces of the Rhine under the leadership of France. He left an immense fortune at his death and bequeathed his magnificent library to the college named for him.

**Mazzini,** *Maht se' ne,* **Giuseppe** (1808-1872), an Italian patriot, born in Genoa. After studying at the University of Genoa he practiced law, and in 1827 began to publish literary and political papers. In 1830 he joined the Carbonari, a secret political society, becoming at once active and influential. In 1831 Mazzini organized the league of Young Italy, the main aim of which was the union of Italy, and in 1837 he took up his residence in London and for several years incessantly agitated the cause of Italian liberty and union. He assisted in the

organization of Garibaldi's expeditions of 1860, 1862 and 1867, in 1870 returned to Italy, and was arrested at Gaeta, remaining a prisoner until Rome was occupied by the Italian army. His great service to the cause of Italian liberation and union lay in his awakening the love of country and freedom in the Italian youth and keeping alive the spirit of insurrection.

**Mead,** *Meed,* **Larkin Goldsmith** (1835-1910), an American sculptor, born at Chesterfield, N. H. During the first year of the Civil War he supplied illustrations from the scene of the engagement for *Harper's Weekly.* Subsequently he removed to Italy, where the greater part of his work was done. Among his principal works are a statue of President Lincoln, at Springfield, Ill.; *Ethan Allen,* in Statuary Hall of the Capitol, Washington; and *The Father of Waters,* at New Orleans.

**Meade,** *Meed,* **George Gordon** (1815-1872), an American soldier, born in Cadiz, Spain, and educated in Philadelphia, Washington, Baltimore and at West Point. He served during the Mexican War on the staff of General Taylor and then of General Scott. Later, as captain, he was in charge of surveys on the Northern lakes. In August, 1861, he was commissioned brigadier-general of volunteers and acted conspicuously at Mechanicsville, Gaines's Mill and Frazier's Farm. He participated in the second Battle of Bull Run and was wounded at Antietam, where he commanded a corps. In June, 1862, he was commissioned major-general of volunteers, in this capacity distinguishing himself at Fredericksburg and Chancellorsville; and the following summer, as commander of the Army of the Potomac, in succession to Hooker, he won on July 1, 2 and 3 the notable victory of Gettysburg (See GETTYSBURG, BATTLE OF). Subsequently as major-general in the regular army, he was in command of the Army of the Potomac during Grant's Virginia campaign of 1864-1865. Following the war he commanded the Department of the Atlantic, the Department of the East and that military district which included Florida, Georgia and Alabama. Consult Pennypacker's *General Meade,* in the Great Commanders Series.

**Meadow Lark,** a bird of the Blackbird Family. This handsome bird, which is about the size of the robin, may be known by its bright yellow breast and under parts, the black spot on its breast, and its back and sides, streaked with black, brown and white. When in flight the white outer tail feathers are very conspicuous. Meadow larks are birds of the open fields, building their partly-arched nest on the ground hidden in the grass. The nest contains four to six brown-spotted eggs. Two or three broods of young are raised each season. In

MEADOW LARK

the fall the meadow larks gather in large flocks and choose more or less marshy feeding grounds. Like other birds of the family, the meadow lark is a valuable destroyer of insects, especially grasshoppers. The song is very sweet and seems to say "can't see me," or "spring o' the year." The meadow lark is found from Newfoundland to the Gulf of Mexico, and westward to the Great Plains. It winters from Massachusetts and Illinois southward.

**Meadville,** *Meed' vil,* **Pa.,** county seat of Crawford Co., 36 m. s. of Erie and 105 m. n. of Pittsburgh, on French Creek and on the Erie and the Bessemer & Lake Erie railroads. The Meadville & Theological College (Unitarian) and the Allegheny College (Methodist), organized in 1815, are located here. There are also several hospitals and fine mu-

nicipal buildings. Meadville is an important market of a fertile and populous county which is rich in petroleum and natural gas. It has oil refineries, machine shops, iron and boiler works, foundries and manufactories of engines, carriages, farm implements and railroad cars. The town was settled in 1788 and chartered as a city in 1866. Population in 1910, 12,780.

**Mealy,** *Meel' y,* **Bug,** an injurious insect of the Scale Insect Family. Unlike the other members of the family, this species excretes its wax in the form of a powdery substance resembling fine grains of flour. The body is flattened and of oval form; about the margin and especially at the extremities are peculiar projections which may aid in locomotion. Only the males are winged. Mealy bugs are common in the greenhouses of northern United States; in Florida they have infested the orange trees and have been particularly troublesome to the sweet-potato crop. Mealy bugs may be destroyed by spraying plants with kerosene emulsion or a tobacco wash. See Insecticide; Scale Insect.

**Measles,** *Me' z'lz,* an eruptive and contagious disease. It usually occurs but once in the life of an individual, and then in childhood. The disease develops about eight days after exposure to the infection and appears in the form of a rash on the face and neck, later spreading to all parts of the body. It is accompanied by fever and a generally weakened condition. The malady is of short duration, unless complications arise. During the period of convalescence care should be taken to keep the patient from taking cold, as serious trouble is often brought on by neglect at this stage of the disorder. Consult Koplik, *Diseases of Infancy and Childhood.*

**Measuring Worm, Looper** or **Inch Worm,** the larva or caterpillar of a moth belonging to the Geometrid, or Earth-Measuring, Family. Although these caterpillars are common, they are not noticeable because their colors are similar to those of the branches upon which they feed, and because, when disturbed, they are apt to stiffen and stand out from the branch like a dry twig. The measuring worms have a peculiar method of locomotion because of the loss of the first three pairs of prolegs (See Caterpillar). Only the anterior and posterior portions of the body are supported; thus the worm moves by clinging to the twig with its forelegs and then moving the hind ones up to them, in the meantime "looping" the central portion of the body to get it out of the way. Children watch the measuring worm as it crawls along the twig and imagine that it is determining the length of its journey; from this fancy have been derived its popular and its scientific names.

The measuring worm spins itself a cocoon, goes into an inactive state for a few days and soon after emerges as an adult. It is then a dull gray or tan-colored moth, with slender body and relatively broad wings.

**Meat Packing,** the industries of slaughtering animals and the preparation of different meats and other products from the carcasses.

Slaughtering. Formerly each town had its own slaughterhouse, or abattoir, but now stockyards for the receiving, care and slaughtering of cattle, hogs and sheep are located at central points, the largest being at Chicago, Omaha, Kansas City, East St. Louis, St. Paul and New York. The animals are brought to these centers by trains and unloaded into yards. After they are purchased by the packers, they are driven up an inclined viaduct to the top of the building, where they are killed. By a variety of power-driven hoisting devices and conveying apparatus, they are carried downward from floor to floor, as the process of dressing proceeds, until the completely dressed carcass is delivered into the cooling rooms. The work requires a very large number of men, each of whom is trained to do one thing quickly and well. Such is the degree of skill attained that a hog is killed and completely dressed in less than eight minutes, and a steer in 45 minutes.

MEAT PACKING

Fresh Meat. The preparation of fresh meat is the most important branch of the meat-packing industry, and its great magnitude is due largely to the advantages of refrigeration and cold storage and the ability to ship the meat long distances in refrigerator cars. Refrigerator cars are owned and maintained by the packers, who get a rental from the railroad using them. These are kept cold by ice packed between the walls or in the top of the car, the temperature being kept at about 35° F. Meat shipped long distances in these cars arrives in a more palatable state than when first slaughtered. The care and maintenance of these cars is a special department of the packing industry and a very important one. The packers also maintain cold-storage plants at all centers of distribution to the local trade.

Curing Meats. Salting, smoking and drying were the original methods employed for the preservation of meats, and formerly the term *packing* was restricted to these methods, though it now includes all the processes employed by the modern packers. Modern methods of preserving meat differ but little from the older methods, but the business is carried on much more extensively. Because of this, greater care is taken and better sanitary methods are employed. The methods of curing different parts of the hog with salt are known as pickling, dry salting and smoking.

*Pickling.* In pickling hams, shoulders, etc., they are submerged in brine and kept under by weights so that the salt can be thoroughly absorbed by the meats, and when the brine becomes weakened, the meats are removed and placed in other receptacles with fresh brine. The usual time required for salting is from 30 to 45 days, the necessary time and the strength of the brine depending upon the cuts of the meat. Usually a small amount of sugar is added to the pickle.

*Dry Salting.* In dry salting, the meat is rubbed with salt, then piled in layers. A layer of meat is placed on the bench, then a layer of salt is spread over it and a second layer of meat placed over this, and so on until the piles are about three feet high. At the end of ten days the meat is repacked and again rubbed with salt, the process being repeated at ten-day intervals until the meat is cured. Dry salting is the method employed in England, and is sometimes called the "English cure."

*Smoking.* In smoking hams, shoulders, bacon and other meats, they are hung in brick compartments or smokehouses in tiers close together. A slow wood fire, usually of hickory or sugar maple, is built beneath, and the smoking is kept up for 12 to 48 hours. The meats are afterwards cooled, and finally wrapped and boxed for shipment. When intended for hot climates, the meats are wrapped in canvas, as well as in paper. This canvas is covered with a yellow paste consisting principally of some clay, and then dried, the object being to exclude the air and keep out vermin. Beef is cured by pickling in a similar manner to that described above. Dried beef is made of lean pieces of meat, which, after being pickled, are dried by smoking.

Canned Meats. For canning, the meat is trimmed from the bones, cut into small pieces and put into a curing pickle of salt, water and a little sugar, to which a small portion of saltpeter is added. After it has remained in this solution sufficiently long to get the degree of saltiness desired, it is cooked in hot water until thoroughly done; then, while hot, it is cut into proper sizes and automatically pushed into cans by machines made for this purpose. After the can has been weighed in order to get the proper quantity of meat in it, it is capped by a tin disk which is soldered over it. The cans of meat are now subjected to a further heating, after which they are washed, cooled and labeled.

By-Products. Meat packing, as practiced in the packing houses of the United States, includes not only meat preserving but the utilization of every part of the animal and the preparation of by-products, such as hides, hoofs, horns, bones, hair, fats, intestines and blood. In some

of the packing houses facilities are at hand to manufacture these by-products into leather, glue, buttons, combs, curled hair, soap, candles, oils, glycerin, etc. All bloods and fats are made use of, for sanitary reasons as well as for profit. From the stomach of hogs pepsin is made, and from the glands of hogs, sheep and cattle valuable medicinal preparations are obtained. All parts and scraps of the animals not used as above are ground up and cooked and employed as a constituent of fertilizers or chicken feed. The value of these by-products, amounting to from $1 to $2 per head for cattle, forms by no means a small part of the profit of the business.

GOVERNMENT INSPECTION. All animals are examined by government inspectors before they are slaughtered, and the meat is also carefully inspected after slaughtering. This inspection gives an assurance of the meat's being perfectly wholesome.

PRODUCTION. The United States leads all countries in meat production, its output being about one-third the world's supply. The number of animals slaughtered per year will average about 5,500,000 cattle, 30,000,000 hogs and 9,000,000 sheep. Chicago prepares nearly two-fifths of the meat produced in the United States. See BACON; BEEF; BEEF, EXTRACT OF; LARD; MUTTON; PORK; SAUSAGE; TALLOW.

**Mecca,** *Mek' a,* a city of Arabia, capital of the Turkish Province of Hedjaz, situated about 60 m. e. of Jiddah. The valley in which it lies is barren and sandy, and in the center of the city, on a lower level than the other buildings, stands the Sacred Mosque on an area which can hold 35,000 people. To this holy shrine come pilgrims of Mohammedan faith the Old World over, often to the number of 100,000, making Mecca an important religious center. These pilgrimages are the chief source of wealth and occupation to the inhabitants of the city, who let their rooms to the strangers, among whom are Malays, negroes, Indians, Persians, Turks, Egyptians and Chinese. The only manufactures are rosaries and pottery; there is some dyeing. The early history of Mecca is accounted for in Mohammedan legend. Non-Mohammedans are excluded from the city, and only a few Europeans are found here. Population, about 50,000.

**Mechanical,** *Me kan' i k'l,* **Equiv'alent of Heat,** the number of units of mechanical energy equivalent to one unit of heat. In the English system one British thermal unit equals 778 foot poundals of work. In the metric system one gram calorie equals 4.187 joules, or 41,870,000 ergs of work. The equivalence between heat and work was first scientifically established by the English physicist, James Prescott Joule, between 1843 and 1850. He measured the mechanical work required to heat a given amount of water a definite number of degrees, and arrived at a result very close to the accurate values just given. See HEAT; CALORIMETRY.

**Mechanical Powers.** See MACHINES, SIMPLE.

**Mechanics,** *Me kan' iks,* that branch of physics which treats of the motions of bodies and the effect of forces in causing or changing those motions. It includes a treatment of those cases where forces distort a body, causing it to change in size or shape, as when a gas is compressed or a spring is bent. It is usual to subdivide mechanics into kinematics and dynamics. See KINEMATICS; DYNAMICS.

**Mechanicsville,** *Me kan' iks vil,* **Battle of,** an engagement of the Civil War, fought June 26, 1862, at Mechanicsville, a few miles from Richmond, Va., between some 5000 Federals under Gen. Fitzjohn Porter, and 10,000 Confederates under Lee. The Confederates made two attacks upon the Union position, which was a strong one, but as Lee had divided his forces, he suffered defeat. Porter moved to Gaines's Mill, near Cold Harbor, during the night. The engagement at Mechanicsville began the "Seven Days' Battles" of the Army of the Potomac.

**Mecklenburg,** *Mek' len burg,* **Declaration,** a set of resolutions declaring for independence, purported to have been

adopted by a convention of delegates representing each militia company of Mecklenburg County, N. C., on May 20, 1775. The fact that the phraseology of the resolutions is very similar to that of the Declaration of Independence, adopted the next year by Continental Congress, has led to a discussion concerning the originality of the latter document. The weight of present historical authority is overwhelmingly against the authenticity of the Mecklenburg Declaration.

**Mede'a,** in Grecian mythology, a famous sorceress, daughter of Colchis, and niece of Circe. She assisted Jason in his search for the Golden Fleece and then fled with him in the Argo to Iolcus (See JASON; ARGONAUTS). The story of Medea is treated in *Medea,* the great tragedy of Euripides.

**Med'ford, Mass.,** a city of Middlesex Co., 5 m. n.w. of Boston, on the Mystic River and on the Boston & Maine Railroad. The city has within its limits the villages of South Medford, Wellington, West Medford, Hillside and Glenwood. It is an attractive residential suburb of Boston. Tufts College (Universalist), founded in 1852, is located here. It has important industrial interests and manufactories of cotton goods, dyes, chemicals, brick, felt boots and novelties. There are large print works and a rum distillery. The city has several parks and contains a number of historical houses, including the Cradock House dating from 1634. Founded as Meadford in 1630, it became a town the following year. A city charter was received in 1892. Population in 1910, 23,150.

**Me'dia,** a country situated in the northern part of the Persian Empire. The Medes were the first of the Indo-Germanic race to play a permanent part in the world's history. They lived in the northern part of the Plateau of Iran and were closely allied to the Persians to the south of them, in language and religion. For a while they were under the power of Assyria, but they united in 708 B. C. and established their capital at Ecbatana. In 606 B. C., aided by the Babylonians, they captured and sacked Nineveh. They received as their share of the booty the eastern and northern mountain regions, reaching from the Persian Gulf to Asia Minor. They were checked, however, to the northwest by the expanding power of Lydia. The Persians under Cyrus the Great rose against the Medes. By 550 B. C. Cyrus had conquered them, and the country remained a part of the Persian Empire until the conquest of Alexander. From the death of Alexander until the time of Augustus, Media was a separate kingdom. During the Sassanian dynasty Media was joined to Persia, and has belonged to it ever since.

**Med'ical College,** a school organized under certain state or national regulations and devoted to the training of physicians and surgeons. The completion of the course carries with it the right to the degree of doctor of medicine (M. D.), and thus state regulation prevents the assuming of this degree by graduates of institutions whose work is below the required standard. The first medical school of which we have record was that of Salerno, Italy, established in the tenth century. Later medical training schools were introduced into all the large European universities and were probably the first professional schools so established. The first medical college in the United States was organized in 1765 under the name of the Medical College of Philadelphia and is still in existence as the medical department of the University of Pennsylvania. At present there are over 200 medical schools in the United States, and a number in Canada, many of which are departments of the great universities. Entrance requirements into such institutions are now rigid, and most of them demand graduation from an accredited college. The courses are from two to six years in extent. Postgraduate medical schools are also common.

A medical school for women, called the Women's Medical College, is located in Philadelphia.

**Medici,** *Med' e che,* a famous Italian family enriched through trade, and noted for its great number of statesmen, who were patrons of art and literature. By 1480 Florence was controlled by the Medici. Lorenzo the Magnificent is the most distinguished member, and under his rule Florence reached the height of its splendor. Catherine, wife of Henry II, was an unscrupulous woman who influenced public affairs during the reigns of her three sons. The popes Leo X, Leo XI and Clement VII, and Maria, the second wife of Henry IV of France, were also members of this family.

**Medici, Lorenzo de'** (1449-1492), a distinguished Florentine man of letters and ruler, called the Magnificent, born in Florence. He came of the family of the Medici who rose to great wealth and power in Florence primarily through their commercial successes. They secured control of the Florentine Republic and made it in reality a despotism. Lorenzo was a patron of art and literature, collecting many valuable specimens of the former and causing important manuscripts to be translated and preserved. He was himself a poet of distinction; but was not so careful a financier as the former heads of his family, spending his fortune lavishly and drawing unwarrantably from the public treasury.

**Medicine,** *Med' i sin,* the science and art of treating and preventing disease and alleviating the effects of injuries.

History. Of all the learned professions the practice of medicine is the most ancient and the most universally respected. Mankind has always been subject to disease and injuries, and from the earliest times the care and treatment of such affections have been relegated to certain classes of society supposed to be especially skilled in such matters. The code of Hammurabi, King of Babylon, 2200 B. C., consists of 282 laws, nine of which refer to the practice of medicine and surgery. It appears from these laws that the physician and surgeon occupied a distinct social position in the ancient Assyrian society, and that even in those remote periods the surgeon was considered worthy of compensation.

The earliest Grecian practice was more a combination of religion and philosophy than a system of remedial measures. The temples erected in honor of Æsculapius, the Greek god of the healing art, were always located in airy, sheltered, healthful places, and might be considered, to some extent at least, as prototypes of the modern sanatorium. The priests who had charge of these temples acquired a certain insight into medical science in time, and were able to help many of the applicants. Contagious diseases were not admitted. Remedial measures consisted largely of gymnastics, bathing, including running barefoot in the grass, dieting and rest cures. The veneration and substantial rewards accorded to the priests of Æsculapius gradually led other priests to practice medicine, and the art fell into disrepute. Hippocrates was a priest of Æsculapius, but emancipated himself and laid the foundation of scientific medicine in Greece about 400 B. C. It is uncertain whether or not Hippocrates himself wrote all or any of the great work which is credited to him, but it represents his teachings and is the only monument of ancient Grecian medicine. Galen (131-200) recognized the importance of the study of anatomy, and his work was authority until comparatively recent times.

Modern medicine may be considered as dating from about the 16th century. From this period on, the advance in scientific knowledge and in knowledge of medical sciences in particular was rapid and more accurately recorded. The invention and improvement of the microscope and the separation of chemistry from alchemy led to closer observation. Bedside and clinical instruction became the vogue, and the invention of printing from movable type contributed no less to the advancement of learning along the line of medical sciences than of other branches of knowledge. The anatomical studies of Vesalius prepared the way for Harvey's studies on the circulation of the

blood in animals, and his paper marks a division between scientific medicine and the experimental practice of earlier schools.

The 18th century is marked by the rise in social status of the medical practitioner, an important discovery being the observation of Jenner that milkmaids who contracted cowpox were thereafter immune to smallpox, leading to the application of vaccination as a preventive against the latter infection. The great advancement of medical science in the 19th century has been due to vastly increased facilities for laboratory investigation and research and to the fact that medicine draws upon all of the physical sciences for its diagnostic methods and remedial agents. Thus when physics produced the X ray, medicine appropriated and utilized the discovery as a diagnostic method of the greatest value. Chemists evolved the coal-tar products and enriched the *materia medica* with numerous organic compounds; and so all of the expanding physical sciences have contributed and are contributing to the growth of medical knowledge.

Among the noteworthy medical discoveries of the 19th century are the invention of the ophthalmoscope by Helmholtz and the stethoscope by Laënnec, both of which instruments instituted a new era in physical diagnosis. The discovery of the anæsthetic value of sulphuric ether in 1846, by Morton of Boston, greatly increased the field of surgery and the safety of operative measures. Pasteur's studies of fermentation and putrefaction prepared the way for the better understanding of the nature of the infectious diseases and their rational treatment, and inspired Lister to give to surgery the antiseptic treatment of wounds.

Following the discovery of plasmodium of malaria by Laveran in 1880 and of the bacillus of tuberculosis by Koch in 1882, most of the organisms concerned in the production of the infectious diseases have been isolated and studied, and the antitoxic treatment of several such disorders, by means of sera from immunized animals, has been placed upon a rational basis. Perhaps the best instance of this work is seen in the antitoxic treatment of diphtheria, and more recently in the prophylaxis of typhoid fever. Attention should also be called to the introduction of cocaine as a local anæsthetic by Koller in 1884, and its value in the surgery of the eye and other special sense organs.

Medical Practice. Practical medicine naturally divides itself into the general divisions of internal medicine, or the nonoperative treatment of disease, surgery, and obstetrics, or midwifery. They are based largely on the sciences of anatomy, physiology, normal and pathological histology, pharmacology, bacteriology and also chemistry and botany, all of which have an intimate relationship with medical practice and are therefore known as the medical sciences.

Schools of Medicine. Various schools of medicine have arisen from time to time, generally basing their apology for existence upon some special theory or treatment or medication. Some have served a useful purpose; as for instance, the sectarian medicine practiced by Hahnemann and his followers, known by them as homeopathy. Although homeopathy was founded upon a theory of the action of drugs not now accepted by therapeutists generally, nevertheless it was an effective protest against the enormous doses of medicines and the abuse of bloodletting in vogue during the 18th century.

Within more recent times various remedial systems have attained considerable popularity among the laity, particularly the mental healing cults and osteopathy.

**Medicine Hat,** a city of Canada in the Province of Alberta, on the Saskatchewan River and the Canadian Pacific Railway, 660 m. w. of Winnipeg. Small steamers can descend the Saskatchewan from the city to Lake Winnipeg, 800 m. distant. There are large deposits of coal and natural gas in this region. Among the important buildings are hotels and banks. The leading industrial establishments include large

grain elevators, brick and cement-block plants, and saw and flour mills. Population in 1911, 5608.

**Medill', Joseph** (1823-1899), an American journalist, born in New Brunswick, Canada. In 1831 his parents moved to the United States and settled at Massillon, Ohio. In 1846 Medill was admitted to the bar and began practicing at Canton. He was attracted to newspaper work, and in 1849 became connected with the Coshocton *Republican*, a paper advocating Free-Soil principles. A Whig paper, the Cleveland *Forest City*, and an independent journal, the *Free Democrat*, also claimed his attention. He purchased an interest in the Chicago *Tribune* in 1856, and in 1874 became principal proprietor and editor-in-chief, a position which he filled during the remainder of his life. He was elected mayor of Chicago in 1872.

**Mediterranean,** *Med" i ter a' ne an,* **Sea**, the great inland body of water almost enclosed by the continents of Europe, Asia and Africa, connecting with the Atlantic Ocean by the Strait of Gibraltar, and with the Black Sea by the Dardanelles, the Sea of Marmora and the Bosporus. It extends 2320 m. and has a maximum width of 1080 m. The greatest depth is 14,400 ft. It receives the Po, Rhône and Ebro rivers from Europe and the Nile from Africa. There is a constant in-flowing current from the Black Sea, and another from the Atlantic. In turn there is an undercurrent flowing in the contrary direction into both bodies of water. The Mediterranean is divided into the Ægean, Levantine, Ionian, Adriatic, Tyrrhenian and Balearic seas. It contains the islands of Sicily, Sardinia, Corsica, Crete and Cyprus and the Balearic Isles.

The European shore is broken by a great number of peninsulas, islands, bays and gulfs, and contains good harbors which have long been conducive to extensive commerce. The African shore, on the other hand, is smooth and unbroken. The sea has fish peculiar to its waters and contains over 400 species, not all of which are useful. There is a wealth of red coral, and the sardine, sponge and tunny fisheries are important. The tides are slight and the prevailing temperature of the surface water is generally higher than that of the Atlantic in the same latitudes.

**Medul'la Ob"longa'ta.** See BRAIN.

**Medu'sa,** in classic myths, the only mortal Gorgon, originally a beautiful maiden whose glory was her hair. When she boasted of it to Minerva, the goddess changed it into hissing snakes. See GORGONS.

**Meerschaum,** *Meer' shom,* a cream-colored clay whose composition consists chiefly of silicon and magnesium. It is used in making tobacco pipes. Its name in German signifies sea foam, which was given it because, when freshly dug up, if rubbed with water it forms considerable foam. The chief deposits are in Asia Minor, and the industry is 2000 years old. A variety of clay very similar to meerschaum is found in the South Atlantic States.

**Megaphone,** *Meg' a fone.* See SPEAKING TRUMPET.

**Mehemet Ali,** *Ma' he met Ah' le,* (1769-1849), an Egyptian pasha and viceroy. In 1805 he was elected pasha of Cairo and began to develop an army and navy modeled after those of the European powers. By his massacre of the Mamelukes in 1811 he gained undisputed control of Egypt. He was making headway against the Sultan when the powers of Europe forced him to sign a treaty continuing his subjection to the Turkish Government.

**Meissonier,** *Mes" so" nya',* **Jean Louis Ernest** (1815-1891), a French painter, born at Lyons and educated in Paris and Rome. His canvases contain historical subjects and portrayals of scenes from everyday life, and they are remarkable for fine finish and microscopic smoothness. About 60 of the 400 of them are in the United States. Other art branches in which Meissonier was successful were etching and engraving on wood. Among his noteworthy works are a portrait of Napoleon, *Cuirassiers* and *The Army of the Rhine.*

**Mekong,** *Ma" kong',* a river of Indo-China, rising in the mountains of central Tibet near the source of the Yangtse-kiang. Its course, generally southeastward, is crooked and interrupted by many falls, and only a small portion of it, near its mouth, is navigable. The total length is about 2800 miles.

**Melanchthon,** *Me lank' thun,* **Philipp** (1497-1560), the younger associate of Luther in the Protestant Reformation, born in Baden. When he entered the University of Heidelberg he changed his name, a common practice among scholars, from Schwarzerd to its Greek equivalent, Melanchthon. Graduating at the age of 14, he took his master's degree at Tübingen at 17, and immediately became a lecturer there. He was called to the chair of Greek at Wittenberg in 1518, where he met Luther. Drawn by Luther's urgency into the field of theology, he prepared in 1521 general outlines of theology, which constituted his first great contribution to the Reformation. His scholarship was of great assistance to Luther in the translation of the Bible, and he did much to crystallize Luther's views.

He wrote the final draft of the Augsburg Confession in 1530, and the next year published a vindication of the same in his *Apology,* the most learned of the Lutheran symbols. Gradually his views of the Lord's Supper became more like those of Calvin, and his relations with Luther were thereby strained, but never broken. Melanchthon was essentially a scholar and a peacemaker. His temper was gentle, historical, judicial and progressive. He was probably the foremost Protestant teacher of his time. Hallam calls him "far above all others the founder of general learning throughout Europe." His Latin and Greek grammars and his treatises on ethics became standard textbooks.

**Mel'ba** (Helen Porter Mitchell) (1859- ), an English operatic soprano. She was born near Melbourne, Australia, the daughter of a British contractor of Scotch descent. At a very early age she gave evidence of superior talent and was educated in music by the best local teachers. But her father was opposed to a professional career, and it was not until after her marriage in 1882 to Capt. Charles Armstrong that she had opportunity for European study. She spent several years with Mme. Marchesi and in 1887 made her professional début in opera at Brussels, taking the name Mme. Melba. Her career in Europe and America has been remarkably successful. Her voice has been pronounced the most beautiful that has been heard by the present generation.

**Melbourne,** *Mel' burn,* the capital and largest city of the State of Victoria, Australia. It is situated on the Yarra River eight miles from its entrance into Fort Phillip Bay, and is entered by many large vessels; ocean-going boats come as far as Port Melbourne at the river's mouth. Melbourne is a busy city with great shipyards and foundries along the river, and is the greatest trade center of Australia. The House of Parliament and other government buildings, the public library, theaters and a modern opera house are among the most important public buildings. There are several educational institutions, among which are a university, botanical and zoological gardens and a museum of natural history. The principal exports are flour, butter, frozen meat, leather, wool, skins and hides and wheat. Population, 591,830. See AUSTRALIA, COMMONWEALTH OF.

**Mel'ilot,** a foreign member of the Pulse, or Pea, Family, which has become a familiar feature of roadsides and meadows. It grows to a height of about two feet, and because of its three leaflets, which resemble those of the clover, it is often called yellow sweet clover. The leaves of the melilot are less broad than those of the clover and are sharply-toothed. The tiny yellow flowers droop modestly on their branching vertical stems and are miniatures of the butterfly-like pea blossoms. White melilot is equally common; it is taller and has white blossoms. Both species bloom from June to August and then bear small pods of seeds. Waste ground which

bears melilot is said to be equally fitted for raising alfalfa.

**Mel'len, Charles Sanger** (1851- ), an American capitalist and railway manager, born in Lowell, Mass. In 1869 he began railway service as clerk in the cashier's office of the Northern New Hampshire Railroad, and in 20 years he had risen to be general traffic manager of the Union Pacific system. In 1892 he became general manager of the New York & New England Railway, later president of the Northern Pacific, then president of the New York, New Haven & Hartford Railroad Company, and in 1910 president of the Boston & Maine Railway Company.

**Mel'on.** See GOURD; MUSKMELON.

**Mel'rose, Mass.,** a city of Middlesex Co., 7 m. n. of Boston, on the Boston & Maine Railroad. It is a residential suburb of Boston. The most important manufactures include boots, shoes and rubbers. Melrose was chartered as a city in 1900 and includes the villages of Wyoming, Fells and Melrose Highlands. Among the interesting features are Middlesex Fells, a state reservation of 1800 acres, and a large natural reservoir named Spot Pond. The first settlement was made in 1633. Melrose formed a part of Charlestown until 1649, and of Malden from that time until it was incorporated in 1650. Population in 1910, 15,715.

**Memling,** *Mem' ling,* **Hans** (1430-1494), a Flemish painter, whose name is also written Memlinc. He early developed a style remarkable for delicacy of finish, elaboration of landscape and costume and minute handling of details, and a technique far in advance of his time. His greatest works were the *Shrine of St. Ursula,* at Bruges; *Madonna and Saints,* now in the Louvre; and *Virgin and Child,* at Chatsworth, England.

**Memminger,** *Mem' in jer,* **Charles Gustavus** (1803-1888), an American statesman, born in Württemberg, Germany. He was taken to South Carolina in infancy and adopted by Thomas Bennett. He graduated at South Carolina College in 1820, was admitted to the bar and began a successful practice in Charleston. For nearly 20 years he served in the State Legislature, where he opposed the doctrines of John C. Calhoun. He joined in the secession movement, and was secretary of the treasury for the Confederacy until 1864, when he retired to private life.

**Mem'non,** a mythical personage frequently mentioned by Greek writers. He was King of the Ethiopians and fought the Greeks in the Trojan War. He was slain by Achilles, after having himself killed Antilochus. Subsequently the name Memnon was given to a statue in Thebes, Egypt, which, because of its size, was also called the Colossus. A vocal stone, it was thought to give utterance to a sound at each sunrise.

**Memo'rial Day,** the day set apart each year, first by custom and later by statute, for the purpose of honoring the memory of the soldiers who fought in the Civil War. The custom of Decoration Day, as it is otherwise called, originated with the Southern States in strewing flowers over the soldiers' graves, and this idea was adopted by a few States in the North. In May, 1868, Gen. John A. Logan, then commander-in-chief of the Grand Army of the Republic, issued an order appointing May 30 of that year for Grand Army services in so decorating graves. The day possibly was chosen because it was the date of discharge of the last Union volunteer of the war. The states which observe the day have adopted it singly, there being no national law on the subject.

**Mem'ory,** the reproduction by the mind of previous thoughts or impressions, and the knowledge that there are impressions that have been received before. The important part that memory plays in one's fund of knowledge renders it important that this power of the mind should be as well trained as possible to reproduce accurately and well; yet failures of memory are of so frequent occurrence that it is probable that too little heed is given to the laws governing it. A person is not, as some suppose, born with a poor or a good mem-

ory, but there are certain times in the life when the memory may be more easily trained than at others, and neglect at this time renders more labor necessary in order to accomplish the same results later. The memory of the child is far inferior to that of the adult, although the memory does not increase in any regular way. It generally shows greatest improvement during the 10th and 11th years and least during the 14th year. It varies, too, in regard to the subject to be remembered, numbers being least easily reproduced, words somewhat more easily and objects or actions most readily remembered.

Laws of Memory. The memory acts according to four laws, known as the laws of association. These were established by Aristotle and are association by contiguity, by succession, by similarity and by contrast. See Ideas, Association of.

Factors That Aid the Memory. There has always been an impression that if a child gives close attention to an impression there should be no difficulty in reproducing it, or, to state it in the converse, if the child cannot reproduce an impression he has given no attention to it. This, however, has long been proved to be a faulty assumption. Give a child a list of nonsense syllables, then after a moment's rest, ask him to repeat them. Again give him another list and immediately afterward turn his mind to a picture or a toy for the same interval as before and then ask him to repeat them. The two results will show that the time spent in rest in the first instance was time well spent. Again, if several books are read in rapid succession none is apt to impress the mind vividly, while if each is digested before the next is read, the result is more satisfactory. Physicians say that if a person is injured by a blow upon the head, the memory, returning later, recalls events that occurred some time before the accident rather than those just prior to it. The process of letting a thought "sink into the mind" is an important part of forming an accurate memory of it.



Other factors which aid in memorizing are more commonly understood: (1) A repetition of the thing to be remembered helps to fix it in the mind. (2) Repetitions after intervals of not too long extent are of greater value than those made immediately. (3) The amount to be remembered is also a matter for attention; it is rarely understood that in memorizing a selection, whether poetry or prose, better and quicker results are secured by reading the entire selection each time rather than memorizing a small portion at a time. (4) Poems are generally more easily remembered than prose, as are also any impressions which can be made to assume a temporary rhythm. (5) Much depends upon the clearness of the mind at the time the impression is received, as a wearied brain fails to grasp what a refreshed one receives readily. (6) The vividness of the impression aids; as a loud, sudden sound, a bright color, an unusual motion are longest and most easily remembered.

Types of Memory. Different minds receive the same impression with differing degrees of vividness, and the explanation of this is to be found in the type of mind upon which the impression acts. Some minds receive visual impressions best, some auditory and some motor. In a class of 30 pupils, probably one-third, the visualizers, remember well the things that are seen written out; these pupils cannot learn readily a poem read to them though read again and again; another third depend upon the hearing and cannot remember the poem so well from reading it themselves as from hearing it read. The last third, depending upon motor impressions, best memorize a selection by writing it out or acting it out. A teacher should constantly remind herself that she has each of these types of mind before her, each requiring its own method of instruction, and that inability to remember is not always a fault of inattention.

Differences between boys and girls in the matter of memory are also worthy of note; girls remember most easily things which they have seen, while boys

remember readily names of abstract things. The memory of a girl is generally better than that of a boy between the 11th and 14th years, while later that of the boy is superior.

**Memphis,** *Mem' fis,* the Noph and Moph of the Old Testament, was situated about 10 m. s. of Cairo. It was the oldest capital of Egypt, and during the periods of ancient Egyptian history there was a shifting of power between Memphis and Thebes. When Alexandria was at its height, Memphis held second place and was still important, though declining, at the time of the Moslem conquest. Although much of its building material has been used to build up other cities, there still remain many relics of interest. Among these are the great statue of Rameses II and the Gizeh group of Pyramids. As the city was a center of learning for ten centuries, there are also many ruins of temples and palaces.

**Memphis, Tenn.,** the metropolis of the state and the county seat of Shelby Co., in the southwestern part of the state, beautifully located on Chickasaw Bluff overlooking the Mississippi River just below the entrance of Wolf River. It is on the Illinois Central, the Louisville & Nashville, the Nashville, Chattanooga & St. Louis, the Yazoo & Mississippi Valley, the Chicago, Rock Island & Pacific, the St. Louis & San Francisco, the St. Louis South-Western, the St. Louis, Iron Mountain & Southern and other railroads, and is connected by boat with all Mississippi ports. It is 396 m. n. of New Orleans and about 530 m. s. of Chicago. It lies 40 ft. above the greatest flood height of the river and 287 ft. above sea level.

Streets, Boulevards and Parks. Memphis has great natural beauty, and its winding drives about the hills and along the river have been laid among the most charming of these scenes. Its park system is remarkable for its beauty and for its extent. Overton Park, on the outskirts of the city, contains a natural hardwood forest, broad, open spaces, well-kept drives and woodland walks about an artificial lake. Pergolas, gardens and a marble memorial fountain add to the beauty of the park, and a large well-stocked zoological garden is both interesting and instructive. Riverside Park lies along the bluff and is remarkable for its views of the river; it is accessible from the river, having a boat landing below the bluff and a long flight of steps reaching the summit. Among the other parks are Confederate Park with the United States Custom-House, Court and Auction squares, Forrest Park, with its lily pond and its fine equestrian statue of General Forrest; Astor Park, Gaston Park, Bickford Park, The Bluff, De Soto Park and a parkway or boulevard over 11 m. in length, including picturesque sunken gardens. The city streets, with their hospitable residences and fine business blocks, are everywhere cared for with the same attention given the parks.

Public Buildings. Memphis has many public buildings conspicuous for their grace of architecture. Chief among these is the classic courthouse, which is one of the most beautiful representatives of American architecture, with its dignified columns and its sculptured figures. Other prominent buildings are the government buildings, the Goodwyn Institute and Public Library, the Auditorium, a Masonic Temple, an Odd Fellows' Building, the Cossett Free Library, the buildings of the many city clubs, the Cotton Exchange and several public hospitals.

Educational Institutions. The city has recently completed a large, modern high-school building, which is an excellent criterion of the public school system. Memphis also has the Hannibal Medical College, the Memphis Hospital Medical College, the College of Physicians and Surgeons, the College of Christian Brothers, the Le Moyne Normal Institute and St. Agnes Academy.

Industries. Memphis is a great distributing center, with its many railroad lines and its great river traffic. Its harbor has been improved until the largest men-of-war could ascend to its docks,

and boat building has long been carried on. The city is the most important cotton market of the interior, and large cotton warehouses and presses stand in the business section. Recently large stockyards have been constructed, and meat packing promises to be a profitable industry. Lumber mills, rice mills and an oil mill care for the products of the surrounding country, and among the many factories may be mentioned those producing furniture, sash and doors, boxes, coffins, carriages, wagons and cars. The Virginia Bridge & Iron Company, the National Biscuit Company, the Memphis Flooring Company and the American Steel & Wire Company all have large plants in or near the city. The city has cheap and excellent water power and over 80 artesian wells.

History. De Soto visited the site of Memphis in 1541 and found a village of Chickasaw Indians. In the 17th century the French built a fort there, which passed into the hands of the United States in 1797. Later the Chickasaws gave up claim to their territory and Memphis was laid out in 1819. It was named after its prototype in location upon the Nile. It was incorporated as a village in 1827 and became a city in 1849. It was the scene of many naval operations during the Civil War. The city has a commission form of government. Population in 1910, 131,105.

**Memphremagog,** *Mem" fre ma' gog,* **Lake,** situated in the southern part of Quebec, Canada, and in the northern part of Vermont, U. S. A. It is a long, narrow lake, extending about 35 m., and contains numerous islands. Magog River is the outlet. The lake is noted for its picturesque scenery and is a favorite summer resort, many villas and hotels lining its shores.

**Menan'der** (342-about 291 B. C.), a Greek dramatic poet, one of the foremost of the Attic New Comedy. He was born at Athens. Only fragments of his plays remain, and our chief knowledge of these comedies is gained from the adaptations made by Plautus and Terence. Menander, according to ancient critics, was distinguished for wit, perfection of language and skillful plots. See Drama.

**Men'del's Law,** a principle of heredity discovered and formulated in 1865, by Mendel, an Austrian monk, but not considered important until reestablished by De Vries, 1900. By means of cross-fertilization of certain varieties of peas, Mendel observed that the offspring of parent plants having corresponding but opposing characteristics retain the characteristic of one parent to the exclusion of that of the other. The retained characteristic is said to be dominant; the other recessive. Of the next generation 25 per cent have the dominant and 25 per cent the recessive, while the remaining 50 per cent have a mixture which consists mainly of the dominant character. This principle, which De Vries established by means of work with primroses, has been found to hold true for animals as well as for plants. The law is important since it establishes principles of heredity which are of use in breeding animals or plants where certain characteristics are especially desired.

**Mendelssohn-Bartholdy,** *Men' del sone-Bar" tol" de',* **Felix** (1809-1847), the celebrated German musical composer, was born at Hamburg, grandson of the philosopher, Moses Mendelssohn. Mendelssohn's father was a successful banker and gave his son a careful academic and musical education. When the boy was ten years of age he appeared in public concert in Berlin, and shortly afterward began to compose music. At the age of 17 Mendelssohn wrote the overture to *A Midsummer Night's Dream,* a work which showed great originality of conception and a thorough mastery of constructive details, and in which the fanciful and grotesque were delicately mingled. This work gave to the composer a place among the distinguished musicians of his day. His precocity expressed itself not only through his music; at an early age he became a polished man of the world, holding his own among the best intellects of his time, yet maintaining, as throughout the re-

mainder of his life, the simple purity of a child.

At the age of 20 he visited Paris, Rome, Munich, Vienna and London. His brilliant orchestral conducting and the charm of his compositions brought wide celebrity, and in the years that followed he was the recipient of many honors from musical societies and from royalty. Mendelssohn's compositions embrace sonatas, symphonies, oratorios, besides numerous smaller forms for voice, piano and orchestra. Among his well-known works are the *Songs Without Words;* the overture to *The Isles of Fingal;* the oratorios, *Elijah* and *St. Paul;* the cantata to Goethe's *First Walpurgis Night;* and *Athalie.*

**Men"ela'us,** in Greek mythology, King of Sparta, brother of Agamemnon and husband of Helen, to recapture whom he led a fleet of 60 ships to the Trojan War. See HELEN; TROJAN WAR.

**Menendez de Aviles,** *Ma nen' dathe da Ah" ve lase',* **Pedro** (1519-1574), a Spanish admiral and colonizer of Florida. In 1565 he was appointed, by Philip II, governor of Florida. He there founded St. Augustine and almost exterminated the Huguenots at Ft. Caroline. His attempt of 1570 to establish a Jesuit mission near Chesapeake Bay failed. Two years later, while preparing to colonize the Potomac and Chesapeake region, he was appointed commander of a fleet against the Low Countries, but died while arranging for the expedition.

**Menha'den,** an important fish of the Herring Family. As a food fish it is not highly valued and was once considered practically worthless because of its coarse, oily flesh; the young were, to a small extent, packed in oil and sold as sardines. Recently, however, the oil, which prevented the use of the fish as a food, has been found to have great value in dressing leather and adulterating other oils, and large factories for its extraction are in operation in the United States. For these factories, the menhaden are generally taken in the fall, as their yield of oil is then six or seven times as great as in the spring. The refuse of the fish after the oil has been extracted is packed and sent to all parts of the country as fertilizer. On account of the abundance of the fish, the great use of the oil and value of the refuse from the oil presses, the menhaden constitutes one of the most valuable American commercial fish, ranking with the cod, herring and salmon.

The menhaden has a long, compressed body, narrow fins and large scales. The head is relatively short and the lateral line indistinct. These fish swim in large schools, close to the surface of the water; their range is from Nova Scotia to Florida. The menhaden has at least 30 popular names, the most common of which are mossbunker, hard-head, bony fish and shippang.

**Men'nonites,** a Christian denomination originating in Switzerland in the 16th century. The name comes from that of Menno Simons, leader of the sect in Holland. The first congregation of Mennonites was founded in Zürich in 1525 by Conrad Grebel and his associates; the movement spread to southern Germany and Austria and later to Moravia and Holland. Among Mennonites emphasis is laid on uprightness of conduct more than on doctrine, divorce is condemned and the bearing of arms and the taking of oaths forbidden. The Church has a congregational form of government. Mennonites first settled in America in 1683, in Pennsylvania. In the United States they are divided into 13 branches, reporting, in 1911, a total membership of 55,007.

**Menom'inee, Mich.,** a city and the county seat of Menominee Co., on Green Bay at the mouth of the Menominee River, 51 m. n.e. of Green Bay, Wis., and opposite Marinette, Wis., with which city it is connected by bridges. The Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Wisconsin & Michigan and other railroads enter the city. Menominee is one of the most important lumber-shipping ports on the Great Lakes and has numerous saw and planing mills. The chief manufactures are lumber, paper, machinery, electrical

appliances, telephones, wire, steel, steam boilers, boxes, beet sugar and shoes. There is a good harbor and the dock facilities are of the best. In Menominee are the county buildings, a public library, a fine high-school building and St. Joseph's Hospital. The first settlement on the site of Menominee was made in 1799 by Louis Chappieu, a French fur trader, but the town was not incorporated until 1833. Menominee was named after the Menominee Indians, a tribe of the Algonquians. Population in 1910, 10,507.

**Menom'onie, Wis.,** a city and the county seat of Dunn Co., 22 m. w. of Eau Claire and 69 m. e. of St. Paul, Minn., on the Red Cedar River and on the Chicago, Milwaukee & St. Paul, the Chicago, St. Paul, Minneapolis & Omaha and other railroads. The industrial features of the town include grain elevators, foundries, machine shops, brickyards, wagon and carriage factories and flour mills. Menomonie has a large trade in lumber, live stock and dairy products. The city is especially noted for its educational institutions. Chief among these are the Dunn County School of Agriculture, the Mabel Tainter Memorial Library, the Dunn County Normal Training School, the Stout Manual Training School and a fine memorial library. The first free traveling library in the state was established here. Settled in 1846, the place was chartered as a city in 1882. Population in 1910, 5,036.

**Mephistopheles,** *Mef" is tof' el eez.* See FAUST, JOHANN.

**Merca'tor's Projection.** See MAP.

**Merchant Marine,** a collective term for the commercial fleets or the shipping of the world or of any nation. Between the War of 1812 and the Civil War, the merchant marine of the United States developed so rapidly that in 1859 nearly 70 per cent of the foreign commerce of the country was carried in American vessels. During the Civil War, however, American shipping suffered such heavy losses that the United States merchant marine has not since then been commensurate with the power and wealth of the nation. The following table gives the tonnage for 1912 of the shipping of the most important nations:

| | |
|---|---|
| British Empire | 19,874,000 |
| United States | 5,258,000 |
| Germany | 4,629,000 |
| Norway | 2,293,000 |
| France | 2,053,000 |
| Italy | 1,399,000 |
| Japan | 1,345,000 |
| Holland | 1,130,000 |
| Sweden | 970,000 |
| Russia | 937,000 |
| Austria | 903,000 |
| Spain | 772,000 |
| Denmark | 757,000 |
| Greece | 668,000 |

**Mercury,** *Mur' ku ry,* (in Greek, Hermes), son of Jupiter and Maia, was messenger of the gods, and presided over eloquence, commerce, traveling, pasturing, as well as thieving and gymnastics. When a few hours old, he invented the lyre by stretching nine cords (in honor of the nine Muses) across a tortoise shell. The same day he stole the oxen which Apollo was tending on the banks of the Amphrysus. Later he stole the trident of Neptune, the girdle of Venus, the sword of Mars, Jupiter's scepter and several of Vulcan's tools. He was cupbearer to the gods previous to Hebe, conducted the dead to the lower world and presided over highways and crossroads, where statuettes of him were placed.

Mercury gave Apollo his lyre, in return for which he received the caduceus, a "golden three-leaved rod," snake entwined, the bestower of riches. From Jupiter he had received winged cap and sandals, by means of which he could instantly be transported wherever he wished, in any form whatsoever, or invisible. Roman merchants celebrated each 13th of May in honor of Mercury.

**Mercury,** the planet of the solar system located nearest the sun. Its mean distance from the sun is about 36,000,000 m. Its period of revolution around the sun, or year, is 88 of our days. It is about one-fourth the size of the earth, being 3030 m. in diameter, and it is only about two-thirds as dense as the earth. The period of its revolution on its axis, or its day, has not been positively settled,

but appears to be the same as its period of revolution around the sun, 88 days. If this be so, then Mercury always presents the same portion of its surface to the sun, that part being always day and the opposite side being always night. Mercury is morning star three times and evening star three times yearly. On account of its nearness to the sun it cannot be seen later than two hours after sunset, nor earlier than two hours before sunrise, and even then it is not easily seen by the naked eye.

**Mercury,** or **Quicksilver,** the only metal which is liquid at ordinary temperatures. It is sometimes found free in the crevices of rocks, but is more ordinarily found in combination with sulphur in a mineral called cinnabar. Mercury is a lustrous, white substance whose vapors and compounds are all poisonous. When it is solid it is extremely malleable. Compounds of mercury and other metals are called amalgams and have many commercial uses. Tin amalgam is used for backs of mirrors, and an amalgam of copper, cadmium, gold and tin is used by dentists in filling teeth. Mercury is used in gold and silver mining for forming amalgams with the silver and gold, from which it is later separated. Pure mercury is used in making barometers and thermometers. Mercury has been known as an element since 300 B. C.

**Mercy, Sisters of,** a name often indiscriminately applied to religious organizations among women, having for their purpose the nursing of the sick and the assistance of the poor. The name properly belongs to an order in the Roman Catholic Church founded in Dublin in 1827. The order includes two classes, choir sisters and lay sisters. The choir sisters devote their time to visiting the sick and other charitable work, and the lay sisters engage in domestic occupations. There are many branches of the order throughout Europe and America. Each community is independent of the others in the order, but is subject to the bishops. Their vows bind them to poverty, celibacy, obedience and charity.

**Mer de Glace,** *Mer" de Glahs'*, (Sea of Ice), an Alpine glacier situated on the northern slope of Mont Blanc. It is 16 m. long and about half as wide, and is formed by the confluence of three glaciers from above. It terminates in the Glacier des Bois, from which arises the Arveyron River in the Valley of Chamouni. The glacier moves downward at the rate of about two feet a day in summer and winter.

**Mer'edith, George** (1828-1909), an English novelist and poet, born in Portsmouth. He studied in Germany and was greatly influenced by the German spirit and literature. On his return to England he showed a marked distaste for law and turned to journalism. He lived in Italy during the Austro-Italian war of 1866, acting as special correspondent for the *Morning Post.* For a short time he was acting editor of the *Fortnightly Review.* His novels and poetry were long unrecognized, except by a few of his intimate friends, among whom were Tennyson, Rossetti, George Eliot and Swinburne. Before his death he was chosen to succeed Tennyson as president of the Authors' Society, and was included by the King in the Order of Merit.

Much of his poetry is obscure, difficult and intellectual, but poems like *Love in the Valley, The Thrush in February, The South-Wester, The Woods of Westermain, A Faith on Trial,* are touched with both music and magic. To Meredith verse was the highest form of expression. His novels are analytical studies of human nature, and rank with the best fiction of his time. The style is peculiar, yet brilliant; his themes are big, bearing on the great emotions of the human heart; his characters are not popular heroes, but strong and significant personalities. He combined successfully humor, irony, pathos, rich imagination and romance. As a moralist Meredith frequently worked through comedy, preferring to ridicule evil-doers rather than to censure them. Among his works are *The Shaving of Shagpat, The Ordeal of Richard Feverel, Evan*

*Harrington, The Egoist, Diana of the Crossways, Celt and Saxon* (unfinished and published after his death), *The Sentimentalists, Modern Love, and Poems of the English Roadside, with Poems and Ballads, Poems and Lyrics of the Joy of Earth* and *Ballads and Poems.*

**Meredith, Owen.** See LYT'TON, EDWARD ROBERT BULWER.

**Meredith, Sir William Ralph** (1840- ), a Canadian statesman, born in Ontario and educated at Toronto University. A leader of the provincial bar, he was city solicitor of London, Ontario, later removing to Toronto, where he was corporation counsel and head of the city's legal department. He entered the Legislature in 1872. While in the House he closely identified himself with the workingman's interest, advocated manhood suffrage, affirmed the necessity of a strong central government, denounced a political head for educational departments and fought against undue clerical influence in educational affairs. In October, 1894, he became chief justice of the common pleas division of the High Court of Justice of Ontario. Queen Victoria knighted him in 1896.

**Mer'iden, Conn.,** a city of New Haven Co., 18 m. s.w. of Hartford and 18 m. n.e. of New Haven, on branches of the New York, New Haven & Hartford and other railroads. Meriden is situated in an agricultural region and is one of the most prosperous industrial centers in New England. Among the attractive places is Hubbard Park, a beautiful natural reservation of 1500 acres, within the limits of which are the Hanging Hills, three elevations which rise about 1007 ft. above the level of the sea. Other parks include the City, Brookside, Hemlock Grove and Hanover. Lake Merimere, the largest of the four reservoirs, is situated near the boundary of the city. Among the institutions are the Connecticut Reform School for boys, Curtis Home for orphan children and aged women, Meriden Hospital, Curtis Memorial Library, a state armory and a tuberculosis sanitarium built by the citizens of Meriden and turned over to the state as a state institution.

Meriden is often called the "Silver City" on account of its extensive manufactories of sterling and silver-plated ware. Other manufactured products include cutlery, britannia ware, machinery, screws, vises, steel pens, cut glass, bronze goods, malleable-iron goods, brass castings, pianos and pianolas, photogelatin, gas and kerosene fixtures, clocks, art glass, tinware, firearms, optical instruments, leather goods, brass castings, curtain fixtures, electrical appliances, wooden and agate ware, oil heaters, rotary engines, art novelties and lamp trimmings. The shipments also include fruit, vegetables and tobacco.

Meriden was originally a part of the Township of Wallingford, a small settlement being made here in 1670 by settlers from the New Haven Colony who purchased a tract of land from the Pequod Indians. The northern portion of this tract was known as Merideen. It was incorporated as a separate parish in 1728 and became a separate township in 1806. A city charter was granted in 1867. Population in 1910, 32,066.

**Merid'ian,** one-half of a great circle of the earth or of the celestial sphere, extending from pole to pole. Meridians are imaginary, and it is customary to say that the sun at the zenith of any place is on the meridian of that place. The meridian of any place produced until it intersects the celestial sphere is the corresponding celestial meridian. In 1884 the United States adopted the meridian passing through Greenwich near London, England, as the standard meridian from which distances are reckoned east and west 180 degrees. This gives the longitude of any place, ship or heavenly body. See ASTRONOMY; CELESTIAL SPHERE; LONGITUDE; RIGHT ASCENSION.

**Meridian, Miss.,** the largest city in the state and county seat of Lauderdale Co., about 90 m. e. of Jackson and 100 m. from the Gulf of Mexico, on the Alabama Great Southern, the Southern, the Mobile & Ohio, the Alabama & Vicksburg and the New Orleans & Northeast-

ern and other railroads. Meridian is the great industrial and commercial center of the state. It occupies the center of a cotton-growing section and has an important cotton trade, and contains cotton and cottonseed-oil mills, railroad machine shops, lumber mills and manufactories of confectionery, hosiery, yarn, clothing, harness, mattresses, brooms, furniture, wagons, foundry castings, stoves, soap, fertilizers and other products. The city has an adequate modern street-railway service and many miles of well-paved streets. The National Cemetery and Highland parks are two of the most beautiful parks in the state.

Among the leading institutions are the Meridian Woman's College (Methodist), Meridian Male College, Lincoln School for negroes (Congregational), and Meridian Academy, a high school, Conservatory of Music and public and parochial schools. Other noteworthy institutions are the East Mississippi Insane Hospital, the State Masonic Widows and Orphans' Home and the Matty Hersy Hospital. There are many fine churches and handsome residences.

Meridian was laid out in 1854 and six years later received a city charter. In 1864 the city, which was a center and depot for Confederate supplies, was destroyed by Sherman's army. In 1906 a large part of the business section of the city was destroyed by a tornado, but it was rapidly rebuilt. The annual Mississippi-Alabama Fair, established in 1910, is one of the greatest of the South. Population in 1910, 23,285.

**Mer'lin,** a name given to the small hawk of Europe, which is related to the pigeon hawk of the United States. The American representative is from 10 to 13 inches in length. The upper parts are bluish-gray, streaked with black on the feather shafts. The under parts are whitish, heavily striped with dark gray; the wings are barred or spotted and the tail is crossed by five light bands. The female is brownish above and is larger than the male. The nest is made on cliffs, in which case the material used is scanty; or in trees, where a rather bulky nest is made of grass and sticks and lined with feathers and other soft material. Four or five reddish-brown eggs are laid. The pigeon hawk is widely distributed, its range extending from the Arctic Ocean to northern South America.

**Mer'rick, Leonard** (1864- ), an English novelist. He was educated at Brighton College and in private schools. Merrick is one of the leading modern British novelists. His stories deal almost entirely with actors and writers, and are characterized by excellence of form, facility of narrative and a graceful and charming style. His idea of the novelist's mission—to be true to life in details as well as in essence—identifies him distinctly with the realistic school of fiction. His novels include *The Man Who Was Good, Cynthia, a Daughter of the Philistines, The House of Lynch, The Actor-Manager* and *Conrad in Quest of His Youth.* He has also written the plays *When the Lamps are Lighted, The Elixir of Youth* and *My Innocent Boy.*

**Mer'rill, Wis.,** a city and the county seat of Lincoln Co., about 145 m. n. of Madison and 185 m. n.w. of Milwaukee, on the Wisconsin River and on the Chicago, Milwaukee & St. Paul and other railroads. The town is an important hardwood lumber market, and the manufacture of sawed lumber, sash, doors and blinds, lath, shingles and other lumber products constitute important industries. Other manufactures are paper and paper pulp. In the vicinity are brickyards and granite quarries. The town is built upon both sides of the river and is about 1270 ft. above sea level. A short distance from the city are Grandfather Falls, from which water power is derived, and the Dells of the Prairie River, both of which constitute scenic attractions. The principal buildings are Lincoln County Courthouse, a fine high school, the T. B. Scott free library, an opera house and the Ravn Hospital, a private institution. Settled in 1875, Merrill was incorporated as a village in 1880 and chartered as a city in 1883. Population in 1910, 8689.

**Merrimac,** *Mer' i mak,* **River,** a stream of New Hampshire and Massachusetts, formed by the union of the Winnipiseogee and Pemigewasset rivers, the latter of which rises in the White Mountains. The Merrimac flows southward into Massachusetts, then turns eastward, emptying into the Atlantic Ocean near Newburyport. Including the Pemigewasset, it has a length of 183 m. Several manufacturing cities utilize its water power, among them Lowell, Lawrence, Haverhill, Manchester, Nashua and Concord.

**Merrimac, The.** See HAMPTON ROADS, BATTLE OF.

**Mer'ry del Val,** *Vahl,* **Raphael** (1865- ), a Roman Catholic prelate, born in London, of Spanish parents. After taking orders in 1892, he became papal chamberlain and, later, prelate of the papal household. Subsequently he was consecrated Bishop of Nicæa *in partibus,* served as secretary of the conclave which elected Pius X pope, and in October, 1903, became papal secretary of state. In November of that year he was created a cardinal.

**Mersey,** *Mur' zy,* a river of England, rising in the northern part of Derbyshire and forming the navigable Liverpool Channel as it flows into the Irish Sea. It is 70 m. long, and by means of a ship canal following its course, vessels can navigate as far as Manchester.

**Mesa,** *Ma' sah,* a small isolated plateau. The typical mesa is a small tableland with precipitous sides and capped by a layer of hard, resistant rock, either limestone or lava, such as may be seen in the region traversed by the Colorado River. Such a formation represents the remnant of what in some former geological epoch was a vast and more elevated plain, but which has been worn down by erosion, except in places where the hard rock layers protected the underlying soft soil, giving rise to a tablelike elevation. The most typical of these formations are the famous Mesa Encantada in New Mexico and the Mesa Verde in Colorado.

**Mes'merism.** See HYP'NOTISM.

**Mes"opota'mia,** in its broadest sense, that region lying between the Tigris and Euphrates rivers, from Armenia to the Persian Gulf. The name Mesopotamia is generally applied, however, to the northern part of this territory, now comprised in the Turkish provinces of Bagdad, Mosul, Aleppo and Diarbekir. In ancient times Mesopotamia was successively ruled by the Assyrians, Babylonians, Persians, Greeks, Parthians and Romans. The country was at one time made fertile by a good irrigation system, and was the home of an advanced civilization. At present it is mostly a barren waste, except along the banks of the rivers. Mesopotamia is mainly inhabited by Arabs, and is nominally under Turkish rule.

**Mesquite,** *Mes keet',* a tree or shrub of the Pulse, or Pea, Family, found in southern and western United States and in South America. It varies in size and development according to the richness of the soil and the amount of moisture obtainable. In many places in the West the mesquite is the only foliage plant for miles. The tree has a long, straight root and a tall or shrublike stem; its branches are numerous and beset with sharp thorns. The leaves are composed of pairs of long, slender leaflets. The flowers appear in rapidly succeeding crops from May until July and are followed by long, thin pods divided into as many cells as there are seeds; these cell divisions are noticeable on the outside of the pod and give it the appearance of a close-set string of beads. The pods are rich in nourishment and are food for stock. The wood is heavy, close-grained and rich brown in color; since it is practically indestructible in contact with the ground, it is used for making fence posts and for underground construction. To some extent it is applied also to cabinetwork. A gum that exudes from the stem, or can be obtained from the pods, is used as a substitute for gum arabic. One species of mesquite having curving, wormlike pods is called screw bean. The different mesquites are variously known as honey locust, honey pod or cashaw.

**Messi'ah** (anointed), a Jewish term corresponding in meaning to the Greek term *Christ*. The Jews were accustomed to anoint their kings, who were often called "The Lord's Anointed." In Jewish prophecy the term, or title, came to be used specifically for a promised king who was expected to redeem his nation from foreign rulers. Some of the more enlightened and godly of the Jews believed that the Messiah was to be a spiritual ruler, but these were greatly in the minority. See JESUS CHRIST.

**Messina,** *Me se' na,* a seaport of Sicily and the capital of the Province of Messina, situated on the Strait of Messina, 59 m. by rail n.e. of Catania. The harbor is sickle-shaped and one of the best in the Mediterranean. Though the site affords a fine view of Mt. Etna and the sea, the city itself possesses no features of great distinction, due to frequent destructions by earthquakes. It is noted industrially for the Mamertine wines of the district, for the fishing and for the manufactured products, including hardware, linen, silk and muslin. Steamship communication is maintained between the city and Marseilles and Naples. The university was founded in 1538; there are also a technical institute and a municipal harbor. Messina is thought to have been founded by pirates from Cumæ in the eighth century. It was in the hands of various nations during the Middle Ages and the centuries following, and in 1861 it became a part of United Italy. The plague of 1743 was very destructive, and the earthquake of 1783 worked further ravages with the population. Population of the commune, about 150,000.

**Messina, Strait of,** a channel connecting the Ionian and the Tyrrhenian seas, and separating Sicily from Italy. It is 24 m. long, varies from 2 to 12 m. in breadth and has a maximum depth of over 4000 ft. The regular tidal currents are strong and navigation is difficult. See CHARYBDIS.

**Met'allur"gy,** that branch of applied science which deals with the extraction of metals from their ores. Some metals are found free; as, for instance, gold and platinum, which usually occur as such, while silver, copper and bismuth are often obtained free. In those cases they require but little treatment. Metals such as iron, tin, lead, zinc, nickel, antimony, mercury and aluminum occur almost invariably in combination with other substances, as oxides, sulphides, sulphates, carbonates, silicates, chlorides, etc.

ORE DRESSING. When ores are mined they are usually found to contain a large quantity of material that is worthless. Most of this is disposed of by crushing the ore and washing it over screens in order to separate or concentrate the desired materials. This process is known as concentration and is performed by machinery. The concentrate is then dried and smelted to procure the metal. Metallurgy has to do not only with the extraction of metals from their ores, but also with the working of them into final products by casting, rolling or pressing. In these final operations the metals undergo changes in the structure of their molecular particles, which, with the chemical alterations assumed in the preliminary working of them, renders their appearance quite different from that in which they were found in the ore.

PROCESSES. Various metals require different treatments, and these may be divided into the following processes: (1) smelting, in which heat, aided by chemical reactions, is employed to extract the metal from the ores; (2) amalgamation, in which an amalgam is formed with the metal and mercury, the mercury afterwards being separated by distillation; (3) chemical extraction, by which the metal is dissolved and afterwards precipitated in solid form by chemicals or by electrochemical deposition; (4) electrolytic, in which the metal is extracted from the ore or refined by an electric treatment, called electrolysis. Sometimes a combination of two or more of these processes is used.

Smelting in blast and reverberatory furnaces is the process most generally used, and is employed in extracting iron, copper and lead from their ores. Amal-

gamation is used chiefly in gold and silver ores. Zinc is heated in fire-clay retorts, and the vapors are condensed. Aluminum is produced by passing a powerful electric current through melted cryolite, in which aluminum oxide is dissolved. Ores containing a small quantity of gold, known as low-grade ore, are generally treated by the cyanide process; after the ore is crushed to a fine powder, it is subjected to a solution of potassium cyanide. When silver ores have been washed with salt, a solution of sodium hyposulphite is used to dissolve the silver chloride. See ALUMINUM; AMALGAM; ANTIMONY; COPPER; IRON AND STEEL; GOLD; LEAD; MERCURY; SILVER; ZINC; BLAST FURNACE; REVERBERATORY FURNACE.

**Metaphysics,** *Met" a fiz' iks,* the name given that phase of philosophic study which deals with first principles or the nature of reality. The name itself is accidental, being derived from the fact that in Aristotle's system this subject was treated after (*meta*) physics. The term is used in both a narrower and a wider sense. In the former, it deals with the ultimate nature of *being,* and is synonymous with *ontology;* in the wider sense it is used to include also the theory of *knowledge;* that is, *epistemology.* The restricted use is the more common. The two widely demarked metaphysical theories are: *materialism,* which maintains that the nature of ultimate reality may be expressed in terms of matter and motion; and *idealism,* which finds a psychical basis for reality. These two main theories are held in many special varieties and gradations. See PHILOSOPHY; MATERIALISM; IDEALISM; RATIONALISM; REALISM; EMPIRICISM.

**Me'teor,** a term applied to any body that enters the earth's atmosphere from without, and, becoming intensely heated by its swift flight through the outer air, is made visible as a spark and is consumed before reaching the ground. Sometimes meteors are seen to separate into pieces or burst like exploding shells. They vary greatly in size, the majority of them weighing probably not more than a single grain, while other bodies are of enormous size. Some of them reach the earth's surface. They are then called meteorites. The meteorites are found to be composed of known chemical elements, iron usually being present. There are numerous theories which attempt to explain the appearance of meteors. It is generally believed that a vast accumulation of meteoric matter moves in an orbit about the sun, and that the periodic showers seen in August and November appear when the earth in its progress approaches this orbit. The unusually brilliant showers occurring every 33 years are probably due to lack of uniformity in distribution of the meteoric material and the occurrence of large numbers of meteors at intervals along the orbit. When the earth approaches one of these groups its attraction for the smaller bodies causes a meteoric shower.

**Me"teorol'ogy,** the science which treats of the conditions of the atmosphere. It may be regarded as a department of physics. Its greatest practical value lies in furnishing data for weather forecasting; and it was the urgent need for such forecasting which first led to a systematic study of certain atmospheric phenomena. Meteorology has only within very recent times developed into an independent science.

Meteorological phenomena may be said to result from the interaction of solar heat, atmospheric moisture and the centrifugal force due to the earth's rotation. The various items which furnish data for this study and which determine the total meteorological condition of the atmosphere are called meteorological elements. These elements are: temperature, humidity, evaporation, cloudiness, precipitation, wind direction and wind velocity, atmospheric electricity, etc. The conditions and properties of the air cannot be perceived with accuracy by the senses; for instance, sensible temperature, or temperature as it feels to the body, is not always the absolute temperature registered by the thermometer. For the collecting of meteorological data,

therefore, delicate recording instruments are necessary. The most important of these are the thermometer, which measures atmospheric heat; the barometer, which records air pressure; the psychrometer, an apparatus for ascertaining the amount of humidity in the air, also the amount of its evaporation; the hydrometer, an instrument for weighing liquids; the rain gauge, which measures the amount of rainfall; and the anemometer, a device for testing wind velocity.

The practical results of meteorological investigation are shown in the reports published by various governmental weather bureaus, chief among which are those of Great Britain, Germany, France, Italy, Austria-Hungary, Russia, India, Argentine Republic, Canada and the United States. The sum which these countries annually expend for the maintenance of meteorological stations, together with that contributed by private funds, amounts to about $6,000,000. This does not include the amounts expended on the several important municipal observatories. In addition to these practical and material advances, contributions to theoretical meteorology have been made by numerous eminent physicists. Chief among those of more recent times are Adolph Erman, Joseph P. Espy, William Ferrel, J. C. Redfield and Lord Kelvin. The study may be said to be still in its infancy, but the present outlook promises important advances for the future. See Weather Bureau.

**Me'ter.** See Met'ric System.

**Meth'ane.** See Fire Damp.

**Meth'odists,** the members of various churches which have sprung from the religious movement in England led by John Wesley (See Wesley, John). Wesley, however, did not aim to establish a new church, but hoped to unite Christians of all classes into Societies for the purpose of religious development. The name Methodist was applied by Oxford students to Charles Wesley and a few companions who lived so strictly as to seem to guide their lives by "method." The first Society was organized in 1739 and others followed. A few Christians would meet in classes (the origin of the Methodist class meeting) to pray and talk of spiritual matters. Over these a leader was appointed to give counsel and direction. The various leaders were appointed by John Wesley, but were independent of each other. In 1743 Wesley formulated the rules for the United Societies. In 1784 the new denomination became legally known as the Wesleyan Methodist Church, the name still retained in Great Britain and certain of her colonies. In 1906 the Wesleyan Methodists in Great Britain numbered 536,612.

Methodist Episcopal Church. In 1784, Thomas Coke was ordained by Wesley as superintendent for America. A Christmas Conference was held at Baltimore, Md., in 1784-85, at which the Methodist Episcopal Church was instituted, an Episcopal Church constitution being drawn up. Since then the Church has had a marvelous growth, both in numbers and in wealth. The United States is divided into conferences, and each conference into districts. The bishops have general oversight of the conferences in the territory over which they preside, while the districts are in charge of district superintendents. Every four years a general conference is held, for the regulation of matters pertaining to the Church as a whole. The chief doctrines of the Church are a belief that all men are sinners; that God loves all men, though hating their sin; that salvation comes from belief in Christ as the personal savior of mankind; that salvation is free to all who repent; that the Holy Spirit works upon the hearts of men to incline them to repentance. The Church is active in missionary and educational work. In 1911 the Methodist Episcopal Church reported a membership in the United States of 3,186,682.

At various times there have been divisions in the Methodist body. The most important of these occurred before the Civil War, when the question of slavery divided the Church and the Methodist Episcopal Church, South, was organized. Another division occurred

in 1860, as a reaction toward primitive Methodism, resulting in the organization of the Free Methodist Church. The colored Methodists have had an organization of their own since 1816 (See AFRICAN METHODIST EPISCOPAL CHURCH). Other minor bodies are the Methodist Protestant, Congregational Methodist, Colored Methodist Episcopal and Union American Methodist Episcopal. The total membership of all Methodist bodies in the United States is over 6,500,000.

**Methu'en, Mass.,** a town of Essex Co., 2 m. n.w. of Lawrence and 30 m. n. of Boston, on the Spicket River and on the Boston & Maine Railroad. It is a popular residential town for the nearby large cities. Chief among the manufacturing establishments are a bell foundry, cotton and woolen mills, an organ factory, hat, yarn and basket factories, a knitting mill and boot and shoe factories. The Nevins Memorial Library and the Nevins House for the Aged and Incurables are located here. The town was settled in 1641 but was a part of Haverhill until it became the town of Methuen in 1725. Population in 1910, 11,448.

**Met'ric System,** a system of weights and measures whose name is derived from the name of the unit of length, the meter. The metric system is of French origin and is based upon measurements of a quadrant, or one-fourth of a meridian, taken by French mathematicians and engineers in 1736. The meter is one ten-millionth of this distance, 3.28 ft., or 39.37 inches. Later measurements have shown that the original figures are $\frac{1}{208}$ of an inch out of the way, but the change has not been made in the metric system.

The unit of the capacity of the metric system is the liter, a cube whose edge is one-tenth of a meter, and that of weight is the gram, the weight of a cubic centimeter of pure water at its greatest density. These standards were adopted in France in 1799 but were not rendered obligatory until 1837. The great simplicity of the metric system consists in its ratio of ten between the successive denominations and in the identity of the prefixes added; thus the prefixes above the unit are, respectively, deka—(10), hekto—(100), kilo—(1000), and myria—(10,000), all taken from the Greek. The subdivisions are from the Latin and are, respectively, deci—(.1), centi—(.01), and milli—(.001). The table of length of this system is therefore:

10 millimeters = 1 centimeter
10 centimeters = 1 decimeter
10 decimeters = 1 meter
10 meters = 1 dekameter
10 dekameters = 1 hektometer
10 hektometers = 1 kilometer

The tables of weight and capacity are similarly made by beginning with the milligram and milliliter, respectively. Because of its simplicity and its exact measurements the metric system is no doubt destined to be the universal system. Since its adoption in France its use is required in Germany, Austria-Hungary, Belgium, Chile, Argentina, Brazil, Peru, Mexico, Venezuela, Italy, Spain, Switzerland, Roumania, Servia, Norway and Sweden; its use is legalized in the United States, Great Britain, Russia, Japan, Turkey and Egypt. The metric system was made legal in the United States in 1866 but was not commonly used. In 1894 it became the standard of electrical units. It is now used almost entirely in weighing foreign mail, in mints, in government publications, in some measurements of the United States Coast and Geodetic Survey and in scientific work. A system of measuring angles by grades, dekagrades, hektogrades, etc., rather than by degrees, has been suggested but never put into practical use, owing to the vast amount of work necessary to reconstruct mathematical tables.

**Met'ronome,** an instrument employed when composing or studying music, the purpose of which is to denote, by marking time, the speed of the playing. It consists of a pendulum swinging on a pivot, below which is attached an immovable weight, and above on the bar is a sliding weight so adjusted as to regulate the length of swing and thus the speed of vibration. Motion is derived

by clockwork, or the metronome may be operated by hand. The tick or noise is audible to the player. See PENDULUM; MUSIC.

**Metternich,** *Met' er nik,* **Clemens Wenzel** (1773-1859), an Austrian statesman. He was educated at Strassburg and won his first claim to notice by representing the Westphalian nobles at the Congress of Rastadt. His diplomatic talent won him rapid distinction. At the age of 28 he was appointed Austrian minister to Dresden, and two years later he was sent to Berlin. After the peace of Pressburg he went as ambassador to Napoleon. Here his cool head and ability to keep his own secrets, while with a bland smile he obtained the secrets of others, stood him in good stead. When war broke out again between France and Austria, Napoleon detained him for a while. When set free he eagerly pressed on the war against Napoleon.

After the downfall of Napoleon, Metternich showed no interest in the German national sentiment which was arising, but by aiding in maintaining the boundaries of France as they had been, he tried to make Austria alone profit by the reassignment of European territory. After 1815 he was extremely reactionary, looking with suspicion upon the least popular demonstration. His government was overthrown by the Revolution of 1848, and he fled from Vienna to England. He returned in 1851, and, though his opinion was often asked by the Emperor, he was never invited to hold office again.

**Metz,** *Mets,* a town of Alsace-Lorraine, Germany, and capital of the District of Lorraine. It is situated at the confluence of the Seille with the Moselle, about 11 m. from the French frontier, and is built partly between the two rivers and partly on the islands of the Moselle. Features of interest include a splendid esplanade with a fountain and with statues of Marshal Ney and Emperor William I; a magnificent Gothic cathedral, begun in the 13th century; the Church of St. Vincent, also dating from the 13th century; and the Church of St. Constance. The city contains numerous educational institutions, including schools of art and music; a municipal library of 85,000 volumes; and a municipal museum containing valuable paintings and antiquities. The manufactures include leather and leather goods, hats, artificial flowers, weapons and cloth.

As a fortress, Metz has had a notable history, ranking with Strassburg as one of the two great bulwarks of Germany's western frontier. In Cæsar's time it was one of the most important towns of Gaul, and was fortified by the Romans and supplied with water by a great aqueduct. In the third century Christianity was introduced. Two centuries later the Huns plundered the town, and later it was taken by the Franks. By the Treaty of Verdun in 843, Metz fell to the Emperor Lothair. It became a free imperial city in the 13th century and attained great commercial prosperity, but by the 16th century it had lost much of its importance. By the Treaty of Westphalia (1648), at the close of the Thirty Years' War, Metz was ceded to the French, remaining a possession of France until the Franco-German War. The town was subjected to a famous siege in this war, capitulating in October, 1870, and was ceded to Germany by the Peace of Frankfort, 1871. Population in 1910, 68,445.

**Mex'ican War,** the war fought between the United States and Mexico, April, 1846, to September, 1847. The struggle was actually an aggression on a weaker power in order to gain more territory for the proslavery party in the United States. Openly, however, the war was caused by the revolt of Texas from Mexico and its subsequent annexation to the Union, 1845, when it claimed, and was supported in this claim by the United States, that its natural boundary was the Rio Grande and not the Nueces River, as had been stipulated in the original Mexican agreements.

Shortly after James K. Polk became president, he sent Congressman Slidell to treat with President Herrera of Mex-

ico regarding indemnity for Texas. Also, he was to open negotiations for California. But as Slidell was not received, Polk ordered General Taylor, with 4000 men, to occupy the left bank of the Rio Grande. Here, near Matamoros, a small band of Americans was defeated by the Mexicans, Apr. 23, 1846, whereupon Polk declared that war existed "by the act of Mexico herself," and formal declaration to that effect followed .

On May 8, 1846, General Taylor, with 2000 men, defeated 6000 Mexicans under Ampudia and Arista at Palo Alto. This was the first important battle of the struggle and it was quickly followed by the Mexican defeat at Resaca de la Palma. The following September, Monterey fell after a short siege. During this time, General Kearny, with considerable aid from Fremont, had conquered New Mexico and upper California.

Meanwhile, Gen. Winfield Scott had assumed chief command in Mexico; Taylor, however, remained in control in the North, sending 10,000 of his men to aid Scott. Thus weakened, Taylor was attacked by the Mexicans under Santa Anna at Buena Vista, Feb. 23, 1847. The Mexicans were defeated and hurried to meet Scott at Vera Cruz. Scott, however, captured the city after a terrific bombardment, March 27, 1847, and a few days later began his triumphal march westward over the National Road to the City of Mexico. On Apr. 18 he defeated Santa Anna at Cerro Gordo, and other American victories followed in quick succession. Late in the summer Scott won a series of brilliant victories at Contreras, Churubusco, Molino del Rey and Chapultepec, entering the City of Mexico Sept. 14. This terminated the war.

The Treaty of Guadalupe Hidalgo was signed Feb. 2, 1848, Mexico relinquishing all the territory south of the 42nd parallel and west of the Louisiana Purchase for a consideration of $15,000,000. The United States also paid claims of American citizens against Mexico to the amount of $3,500,000. By the addition of the Gila Valley, which was subsequently bought for $10,000,000 (See GADSDEN TREATY), the United States secured, all told, about 900,000 sq. m. of territory.

**Mexico**, a republic of North America lying between the United States and Central America. Its broadly-curving eastern coast forms a part of the limits of the Gulf of Mexico, with its broad arm, the Gulf of Campeche, while at the west the long Peninsula of Lower California, partially separated from the mainland by the Gulf of California, is washed by the Pacific. The Rio Grande divides it from Texas, and the Hondo River at the south forms its natural separation from British Honduras. The area of Mexico is 767,005 sq. m., or about three times that of Texas.

PHYSICAL FEATURES. Mexico is a mountainous country having low, narrow coastal regions on both oceans, from which rise the various ridges of the great mountain system, a continuation of that of western United States. Centrally there is a broad plateau above which rise irregular mountain peaks not much elevated above the plateau. Hundreds of volcanoes, active, dormant and extinct, occupy the plateau and the plains. The highest of these lie southwest of the City of Mexico and include the Peak of Orizaba (18,250 ft.), Popocatepetl (17,876 ft.), Ixtaccihuatl (16,960 ft.), Volcán de Colima (12,750); the last of these has been active since 1900. Many are covered with snow throughout the year, and one, Ixtaccihuatl, has upon its summit the great Porfirio Diaz Glacier, the only one of great size in Mexico.

LAKES AND RIVERS. Mexico has few rivers of importance for navigation. The greatest is the great Rio Grande, but it is too much blocked by bars to be of value to any but small boats. It does, however, supply water for irrigation channels, and for this reason its bed is often almost dry. The Rio Conchas rising in southern Chihuahua is the greatest Mexican tributary of this stream. The Rio de Tampico and the San Juan are fairly large rivers, but are of little value for commerce be-

cause of their torrents and rapids. Probably the best-known Mexican stream is the Coatzacoalcos in the Isthmus of Tehuantepec, which was once investigated as the possible beginning of an ocean to ocean canal. The lakes of Mexico are numerous. Lake Chapala in Jalisco is the largest, but the valleys, the plateaus and the craters of the volcanoes have their lakes of clearest blue, generally in settings unusually picturesque. Many of these are connected by canals and form waterways or parts of the fine irrigation system of the republic.

Climate. The Mexicans divide their country into the hot lands, temperate lands and frigid lands. The first are those that lie less than 3000 ft. above the sea level. There the climate is moist, hot and generally unhealthful. In the second, the temperate lands, which are at an elevation of from 3000 ft. to 7000 ft., the air is cool and pleasant and the climate equable. Snow is not uncommon even as far south as the City of Mexico, but it never lasts long. Earthquakes, though frequent, are usually slight.

Industries and Products. Agriculture may well become the chief industry of Mexico, for even at present, with the primitive methods employed, the country, especially in the "hot lands," yields abundantly. American capital has been attracted into Mexico and this, with the newly-established experiment stations of the agricultural department, has tended to improve methods of production. The natural products of Mexico are the great forests of palm, acacia, rubber, rosewood, mahogany, brazilwood, campeachy wood, ebony and ironwood, the cactus and such fruits as the mango, pomegranate, orange, pineapple, coconut and banana. Following in the wake of cultivation come the superior Mexican coffees, cocoa, sugar cane, agave, corn, wheat, maize and beans. Spice growing and tea culture give promise of becoming profitable.

Mexico is the greatest silver-producing country of the world. The modern methods of extraction have made the ores once thought to be valueless, now worth mining, and in one region the very streets of the cities that had been paved with tailings from the old mines were found to yield a profitable per cent of silver. The most productive mines are those of Guanajuato, El Oro, Pachuca, Santa Eulalia, Parral and Zacatecas.

One of the largest gold camps of America occurs at El Oro, and in many localities lead, iron, copper and zinc are produced in great quantities. The copper mines are chiefly in Lower California. The Mexico mining laws have been continually improved until they are now advantageous to foreign capital, and to this is due the rapid growth of the mining industry. In the region of Vera Cruz are oil wells, remarkable for their production.

The manufactories of Mexico are extensive. The making of textiles is the leading one among these, but the weaving and the dyeing of the cloth is often carried on in private homes. The dyeing of the purple goods is an occupation by itself, for the dye is collected from a species of mussel similar to that which produced the royal purple of the East. The collectors go to the tiny islands where the mussels are common and carefully remove the animals, shells and all, from the rocks. By blowing into the shell the men cause the mussels to exude a few drops of the liquid that forms the basis for the dye. The mussel is then tenderly returned to the rock to await another collecting day. Sugar, rum, molasses, distilled liquors, rope and tobacco are manufactured in the south, and everywhere saddlery, boots and shoes and artistic pottery and jewelry are made and presented for sale.

Transportation and Commerce. Mexico presents many contrasts in transportation. Up the Coatzacoalcos go the picturesque tall-prowed dugouts of the natives, side by side with modern steamers and sail boats. Along the great railroads, now all united under the name of National Lines of Mexico, the elegant Pullmans, equipped with every conven-

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ience of the modern train, flash past the winding roads, where the natives carry their heavy packs, and the swift automobiles pass the long mule trains jangling their discordant bells. There are about 16,000 m. of railroads and long lines of telephone and telegraph connecting all the cities with the outer world.

PEOPLE AND RELIGION. The inhabitants of Mexico are of many classes, whites, Indians and mestizos, or mixed races. The Indians are the descendants of once-powerful tribes. They differ greatly in dress and in customs and, in general, have little of the energy, executive ability and skill of their ancestors. Many of these dwell in villages in Yucatan and the Isthmus of Tehuantepec, where they live by agriculture and by trading. The Zapotecas are the most intelligent of the tribes and are a gentle, hard-working and refined people. The Mexicans are of widely different classes. The wealthy class has always furnished the rulers and the higher officers of the army. These are of Spanish and Indian descent, aristocratic in looks and in bearing and much like their Spanish ancestors. They have acquired their wealth from the natural resources of the country and through the force of arms. The poorer classes are, in general, inefficient and lazy. By contrast, however, they are excitable, fond of bright colors and gayety, and are easily influenced.

The Roman Catholic religion prevails, though the greatest religious freedom is allowed. The Indians have nominally adopted Catholicism, but the most of them still cling to their ancient superstitions.

GOVERNMENT. Mexico is a constitutional republic, a federative republic made up of 27 states, three territories and a Federal District. Its model is the United States Government, and its executive power is vested in a president and vice-president, who, because of the character and traditions of the people whom they govern, are almost autocratic. The legislative department is vested in a Congress made up of a House of Representatives and a Senate. The executives are elected for six years, and the congressmen for two. Congress meets twice annually, and a permanent committee of both houses meets during the interim of sessions. In the absence or disability of the president and vice-president to perform their duties, Congress calls immediately for new elections, which are to be held as soon as possible. Each state has its own internal constitution, government and laws, with a governor, Legislature and judicial bodies. The constitutions are based upon the Federal Constitution and uphold its principles. The principal cities are Mexico, Guadalajara, Puebla, San Luis Potosi and Monterey.

HISTORY. Mexico is a country of an old civilization, and as early as the seventh century a people known as the Toltecs lived in the region of the northern rivers. The name of the country is derived from that of a tribe of Indians also found in the North and called the Mexicas, or Aztecs; they must have entered Mexico as early as the 12th century and soon after laid the foundations of Mexico City. Even this early, Mexico was a land of poverty, famine, jealousies and conflicts. It was conquered by Spain in 1521, and for nearly 300 years was under the domination of viceroys and governors, each having a period of government that averaged scarcely more than five years. These rulers and their followers robbed the mines, oppressed the people and checked all attempts at Mexican independence until the beginning of the 19th century. In 1810 Hidalgo, a Mexican patriot, incited a revolt that resulted, after 11 years of desperate fighting, in gaining independence for Mexico. For three years there was a monarchial form of government; then, in 1824, the Republic of Mexico was established, although on a rather uncertain basis. For many years Santa Anna was the leading spirit in Mexican politics (See SANTA ANNA, ANTONIO LÓPEZ DE), and he sometimes exercised arbitrary powers. In 1835 Texas, which had formed a part of Mexico, declared its freedom, and when it united with the United States,

war broke out between the two countries. Mexico, which during the war had 12 executives, was defeated. By the Treaty of Guadalupe Hidalgo, Feb. 2, 1848, Mexico received $15,000,000 and lost part of the present Colorado, Wyoming, Arizona and New Mexico and all of Utah and Nevada.

After many years of political uncertainties, during which the Constitution of 1857 was adopted, Maximilian of Austria was asked to become emperor. In 1867 he was executed, and Mexico again became a republic (See MONROE DOCTRINE). Porfirio Diaz took the office from his predecessor by force in 1876, and was elected president the following year (See DIAZ, PORFIRIO). With the exception of four years (1880-1884), Diaz was in office until 1911. He ruled with a strong hand, and the Government of Mexico was put on a firmer basis than formerly. An insurrection, headed by Francisco Madero, led to the retirement of Diaz, and he resigned in May, 1911. In February, 1913, Madero was deposed and executed. The revolution which accomplished this was headed by Victoriano Huerta and Felix Diaz, a nephew of Porfirio Diaz. Huerta assumed the office of provisional president, but almost immediately a revolt against him broke out. The revolutionists, who called themselves Constitutionalists, were headed by Venustiano Carranza. Francisco Villa led the forces in the field. During the revolution the American flag suffered insults from the Mexican Federalists, and in April, 1914, Vera Cruz was occupied by United States troops. A probable war between the United States and Mexico was averted by the offer to mediate on the part of Brazil, Argentina and Chile. The mediation conference, which was held at Niagara Falls, Canada, from May 20 to July 1, accomplished little, but the continued success of the Constitutionalists led finally to the resignation of Huerta (July 15, 1914). He appointed as his successor Francisco Carbajal. The latter was soon compelled to resign, and on Aug. 15 the Constitutionalists took possession of Mexico City. General Carranza then became provisional president. Population in 1911, 15,063,207.

**Mexico City,** the capital of the Republic of Mexico, on a plateau 7350 ft. above sea level, about midway between the Gulf of Mexico and the Pacific Ocean and 1225 m. s. of El Paso, Tex. Mexico has one of the most beautiful sites of any city in the world. From it can be seen the snow-capped peaks of the Cordilleras, the most prominent among them being Popocatepetl and Ixtaccihuatl. The altitude gives the city a pleasant and equable climate. It is regularly laid out, and the modern portion is characterized by good buildings, which are distinctly Spanish in their style of architecture. The Plaza Mayor, or Great Square, is the center of civil and social life. Around this are the Cathedral, one of the finest churches in America; the municipal palace or city hall; and the National Palace. The buildings of the city are massive, but they seldom exceed two stories in height. The city is well drained and has a good system of waterworks and public schools; and the National Museum has a very complete collection of Aztec antiquities. There are also a school of mines, schools of emergency and medicine, an observatory and a national theater. The manufactures are chiefly cotton goods, linens, silks, hats, paper, pottery, leather and gold and silver plate. Population in 1910, 470,659.

**Mexico, Gulf of,** a large and partly enclosed basin of the Atlantic, with the United States to the north and Mexico to the west and south. It opens into the ocean through the Strait of Florida, between Florida and Cuba, and into the Caribbean Sea through the Yucatan Channel, between Cuba and Yucatan. Its length from east to west is about 1000 m., with a continuous coast line of about 3000 m. The estimated area is 600,000 sq. m.; the maximum depth, 12,700 ft. It receives the Mississippi, Rio Grande, Colorado of Texas, Appalachicola, Brazos, Mobile and Sabine rivers. Among the islands of importance are the Florida Keys and those lying along the Yucatan

coast. The shores are so low that there are few good harbors, except those of Galveston, Mobile, Tampa, Pensacola and Vera Cruz. In winter furious gales prevail, coming as reflex storms from the tropics. The Gulf Stream, entering by the southern passage and curving around the Gulf until it finds an exit through the Strait of Florida, heats its waters to eight or nine degrees higher temperature than the waters of the Atlantic in a corresponding latitude. See GULF STREAM.

**Meyer,** *Mī' er,* **George von Lengerke** (1858- ), an American diplomat, born in Boston, Mass. He graduated from Harvard University and went into business. His election to the Common Council of Boston was the beginning of his political career, after which he entered the Legislature of the state and was made speaker of the House. In 1900 President McKinley appointed him ambassador to Italy. Five years later he was ambassador to Russia, and in 1907 he succeeded George B. Cortelyou as postmaster-general of the United States. In 1909 Meyer became secretary of the navy.

**Miami,** *Mi am' y,* or **Great Miami,** a river of Ohio rising in Hardin County and entering the Ohio in the southwestern part of the state. It is about 200 m. long. Hamilton, Dayton, Troy, Piqua and Sidney are the principal cities on its banks.

**Miami, Fla.,** a city and county seat of Dade Co., 156 m. n.e. of Key West and 366 m. s. of Jacksonville, at the mouth of the Miami River, on the west shore of Biscayne Bay and on the Florida East Coast Railway. Steamship lines connect with various Atlantic coast ports, and there is a direct steamer connection for Havana, Cuba, and Nassau in the Bahama Islands. Miami, known as the "Magic City," is situated in a fertile agricultural region surrounded by orange, grapefruit and coconut groves, pineapple plantations and truck farms. Fish are shipped in large quantities, and in Biscayne Bay are important sponge fisheries.

Miami is one of the most popular of the Southern winter resorts, and the city contains palatial hotels, beautiful residences, a city hall, courthouse, postoffice, numerous banks, handsome churches, modern schools and substantial business blocks. There is pure artesian water and gas for light and fuel. Bay Boulevard, Royal Palm, Biscayne and Lawrence drives are among the noted drives of the city. Miami is the trading point of the Seminole Indians. Drainage canals, 50 ft. wide and 10 ft. deep, have been constructed from Lake Okechobee, north of the city, to tidewater, to drain the Everglades. These drainage canals were completed in July, 1913. With the improvement of Miami Harbor by the Federal Government and donations by Henry M. Flagler, builder of the East Coast Railway, the city became one of the important shipping points on the South Atlantic Coast. The first settlement was made in 1896 when the place was chosen as the southern terminal of the railroad. Population in 1910, 5471; city census, 1913, 12,380.

**Miami and Erie Canal.** See CANAL.

**Mica,** *Mī' ka,* a group of minerals of complex and variable composition, consisting chiefly of aluminum silicate together with potassium, sodium, iron and magnesium. Mica is found in nearly all kinds of igneous rocks. The crystals are usually in the form of hexagonal scales, which may easily be reduced to remarkable thinness by continued splitting parallel with the base. Mica ranges from the transparent, colorless variety, known as muscovite, to an opaque red, yellow, green, brown or black. It is highly elastic, flexible and tough, a poor conductor of heat and of electricity.

Muscovite is the chief commercial species. It is used for lamp chimneys, gas burners, stove and lantern windows, as an absorbent of nitroglycerin in the manufacture of dynamite and for lubricating and insulating purposes. Formerly it was used for windowpanes of houses. For decorative purposes mica is made into spangles, ground into powder and used for producing a shining frostiness

on toys and stage scenery. Ground mica is also employed in the manufacture of paints and wall paper; while in sheet form it is used for lantern slides, for holding photograph films, as a transparent protective covering in place of glass and in innumerable other ways. The mining of mica is an important industry in India, where about one-half of the world's supply is produced. Canada and the United States yield about equally the remaining proportion.

**Micah,** *Mi' ka,* a book of the Old Testament, the author of which, Micah, was one of the 12 minor Hebrew prophets, who flourished during the reigns of Ahaz and Hezekiah. The prophecies have to do with both Israel and Judah and include forewarning of future judgment and prediction of the gathering together of all nations under the rule of the Messiah. Some modern critics dispute the authorship previously accepted, attributing to Micah only the first three chapters. See BIBLE, subhead *The Old Testament.*

**Mica Schist,** *Shist,* a metamorphic rock which forms in layers and is composed essentially of mica and quartz. The mica present is usually the colorless variety known as muscovite; biolite, the dark variety, occurs less frequently. Its property of being foliated, or arranged in layers, makes it easy to split. Numerous minerals are found embedded in it, notably garnet. Mica schist occurs in great abundance in mountainous regions. It is a chief constituent of the Appalachian and White mountains, giving to the latter a peculiar effect of whiteness (whence the name) caused by reflection. See WHITE MOUNTAINS.

**Michelangelo Buonarroti,** *Mi" kel an' ji lo Bwo" nar rot'ee,* (1475-1564), one of the most conspicuous figures in the history of art, was born at Caprese, the son of a poor but proud Florentine gentleman. He was a pupil of Ghirlandajo, and his art was influenced by the works of Donatello and Signorelli and the antique marbles in the gardens of his patron Lorenzo de' Medici; also by the poets and scholars of Lorenzo's brilliant court, by Savonarola, and by the teachings of Dante. His earliest important extant works are a *Pieta* (St. Peter's, Rome), *Virgin and Child* (Bruges) and *David* (Florence), the last a triumph of technical mastery. In 1508 Pope Julius commissioned him to decorate the ceiling of the Sistine Chapel of the Vatican, a monumental work, which engaged the artist four years. This and the *Last Judgment,* painted in the same chapel many years later, are his only important work with the brush. In many respects they are the most important frescoes in the world today, and yet the artist had declared that he was no painter. It was as a sculptor that he desired to be known. Here his unparalleled knowledge of the human form, and the grandeur and majesty of his style found full expression.

The number of his extant finished works is very small. Several pieces, which he is known to have executed, have either been destroyed or have otherwise disappeared. In the period of his greatness he was overwhelmed with commissions, few of which he could undertake. Many of his gigantic schemes were never carried out, owing partly to the turbulent state of the country, the vacillations of his patrons and his own physical limitations, which made it impossible for him to execute with his hand all that the creative impetuosity of his mind imposed; and with his fitful temper he could never keep assistants. The most important of his works are two tombs, one for Pope Julius II and the other for the Medici family at Florence. Neither was ever finished, but details of the Julian monument, the seated figure of Moses, representing the patriarch in a moment of righteous wrath, and two Slaves, intended as part of the frieze, are among his most impressive creations. The former is in the Church of San Pietro in Vincoli, Rome, the latter in the Louvre. The architectural repository for the Medici tomb was designed and carried out as to lighting and arrangements according to the artist's plans, and the general effect is

one of sublimity and grandeur. The tomb contains two colossal, symbolic figures representing Lorenzo and Guiliano de' Medici, which occupy two niches above groups of reclining figures resting on the sarcophagus and symbolic of Dawn, Evening, Day and Night.

In the last years of his life Michelangelo devoted himself entirely to architecture; he was appointed architect to St. Peter's in 1547, and designed the present dome, which was completed in accordance with his plans after his death. He died in Rome, the last great Florentine of the High Renaissance.

**Michelet,** *Meesh le',* **Jules** (1798-1874), a French historian, born in Paris. When only 23 years of age he became professor of history in the Collège Rollin, where he also filled the chair of ancient languages and philosophy, lecturing at other colleges occasionally. In 1830 he was given the care of the historical section of the archives of France, and eight years later he accepted the chair of history in the College of France. Michelet's great work is *The History of France.* He wrote also on natural history, *Woman, Love, Introduction to Universal History* and *Beginnings of French Law.* Many of his books have been translated into English.

**Michelson,** *Mi' kel sun,* **Albert Abraham** (1852- ), a celebrated scientist, born in Germany and educated in the United States Naval Academy, at Berlin and Heidelberg universities and in France. He was successively professor of physics in the Case School of Applied Science, Cleveland, and in Clark University, and head of the department of physics in the University of Chicago. Among the many honors which have fallen to Dr. Michelson was the award in 1907, by the Swedish Academy of Sciences, of the Nobel prize of $40,000 for researches in physics.

**Michigan,** THE WOLVERINE STATE, also called *The Peninsula State,* is one of the East North Central States. The state is divided by the Great Lakes into two parts, known respectively as the Upper Peninsula and the Lower Peninsula. The Upper Peninsula is bounded on the n. by Lake Superior, on the e. by St. Mary's River and on the s. by the Straits of Mackinac, Lake Michigan and Wisconsin. The Lower Peninsula is bounded on the n. by the Straits of Mackinac, on the e. by Lake Huron, St. Clair River, Lake St. Clair, Detroit River and Lake Erie, on the s. by Ohio and Indiana and on the w. by Lake Michigan.

SIZE. The extreme length of the Upper Peninsula from east to west is 318 m. The greatest breadth is 164 m. The extreme length of the Lower Peninsula is 277 m. and its breadth is 187 m. The area of the state is 58,915 sq. m., of which 500 sq. m. are water. The coast line is over 1600 m., the greatest of any state in the Union. Michigan is almost the exact size of Florida, larger than Illinois or Wisconsin, about one-half the size of the United Kingdom and the 22nd state in area.

POPULATION. In 1910 the population was 2,810,173. From 1900 to 1910 there was a gain in population of 389,191, or 16.1 per cent. There are 43.9 inhabitants to the square mile and the state ranks eighth in population.

SURFACE. In the northwestern part of the Upper Peninsula is a low range of mountains known as the Mineral Range, extending into Wisconsin in a southwesterly direction. The northeast extension of this range forms Keweenaw Peninsula. The western part of the Upper Peninsula is generally rocky and uneven, but the eastern part is low, with a slight slope to the eastward.

The Lower Peninsula is generally undulating and contains but little high land. In the south-central part is a table-land having an elevation of about 400 ft. and extending into Ohio and Indiana. Northwest of Detroit is another small area of elevated land, and at that part of the peninsula between Saginaw Bay and Lake Michigan is a plateau, or table-land, which extends northward as far as Alpena and occupies about one-half of this part of the peninsula. Its highest point is about 800 ft. above the lake surface. The divide separates the rivers flowing

into Lake Huron from those flowing into Lake Michigan and extends north and south a little east of the median line. A depression which was formerly the bed of an old glacial river extends southwestward from Saginaw Bay to the mouth of the Grand River. Southwest Michigan is characterized by the valleys of the St. Joseph, the Kalamazoo and the Grand rivers, separated from each other by rolling elevations. The deepest indentation on the east coast is Saginaw Bay and on the west coast Grand Traverse Bay. The shores of Lake Michigan in many places contain sandhills, or dunes, of large proportions.

Rivers and Lakes. Most of the rivers are short and shallow. The streams flowing into Lake Michigan going from north to south are the Manistee, the Muskegon, the Grand, the Kalamazoo and the St. Joseph, and the Au Sable and the Saginaw are the chief rivers flowing into Lake Huron. There are many small but rapid streams throughout the state which are valuable for water supply and water power. The St. Mary's River belongs both to Michigan and to Canada. Michigan is estimated to have over 5000 lakes. These are generally distributed in the Lower Peninsula, 175 of them lying in the basin of the Kalamazoo River. Some of the most important of these lakes are Pine, Houghton, Mullets and Burts in the Lower Peninsula, and Manistique in the Upper Peninsula. These lakes are often valuable sources of water supply.

Scenery. The many clear lakes occupying valleys and plains and surrounded by forest-clad shores add much to an already pleasing landscape. Some of the streams have worn deep and interesting channels along their courses. On the southern shore of Lake Superior are the famous pictured rocks, consisting of cliffs of sandstone which have been worn into fantastic forms by wind and wave. At Sault Ste. Marie are the great rapids in the St. Mary's River, forming one of the most interesting waterfalls in the country. With few exceptions the Lower Peninsula is in a high state of cultivation, and contains thousands of orchards which add much to the beauty of the landscape.

Climate. The Upper Peninsula has a cool temperate climate with long, severe winters having heavy snowfall, and cool summers. The Lower Peninsula has a climate far different from that of most regions in the same latitude. Nowhere else is the influence of large bodies of water on climate more clearly shown than in Michigan. The winters are much milder and the summers much cooler than in other states of the same latitude. This equable climate to which Michigan owes her excellent fruit is due almost wholly to the influence of the Great Lakes. The mean temperature of the Lower Peninsula for July and August is 72°, and from 14° to 23° for January and February. The temperature of the western part of the Lower Peninsula is influenced by southwest winds which blow over Lake Michigan, and damaging frosts seldom occur for a distance of ten miles inland from the lake. The annual rainfall is 30 inches.

Minerals and Mining. The iron mines of the Upper Peninsula are second in importance only to those in Minnesota. On Keweenaw Peninsula are the famous Calumet and Hecla copper mines, and the supply of copper in this region is practically inexhaustible. Michigan is the second state in the Union in the production of iron ore and the third in production of copper (See Copper; Iron and Steel). Around Saginaw Bay and Manistee are extensive deposits of salt, and in the production of this mineral Michigan rivals New York. The salt is obtained by dissolving it in water, then evaporating the brine. Around Grand Rapids are large deposits of gypsum. Clay suitable for making brick is widely distributed. Marl occurs in the southern part of the state and cement rock in various places. Grindstones are quarried along the shore of Lake Huron and there are coal fields of considerable proportions in the central part of the state.

Forests and Lumber. Formerly the northern part of the Lower Peninsula and a good portion of the Upper Pen-

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insula were covered with forests in which white pine predominated. At one time Michigan was the leading lumber-producing state. The pine has been practically exhausted, but south of the original pine forests there are large areas covered with forests and containing maple, elm, walnut, butternut, basswood, poplar, oak, birch and beech among the hard woods, and hemlock, cedar and tamarack among the soft woods. In these forests lumbering is still an important industry. Pine and spruce not suitable for lumber are cut for the manufacture of wood pulp.

Agriculture. Agriculture is the leading industry of the state and gives employment to about one-third of the inhabitants. More than four-fifths of the farms are cultivated by their owners. The richest agricultural region is in the southern part of the Lower Peninsula.

*Soil.* Most of the soil is a rich loam. In the lowlands it is alluvial and very fertile. There are a few sections in which the soil is sandy.

*Products.* The most important field crops are hay and forage, corn, wheat, oats, sugar beets, chicory and potatoes. The state has a great variety of products. The western and central parts of the Lower Peninsula contain extensive orchards, and apples, peaches, pears, plums and cherries of excellent quality are raised in large quantities. Michigan is also one of the leading states in the production of strawberries, raspberries, currants, grapes and other small fruits. Vegetables are raised in the southern part of the state. Michigan leads in raising lettuce, peas, beans, celery and peppermint. Celery is grown both in the Lower and Upper peninsulas. In the central part of the Lower Peninsula sugar beets are raised in large quantities, and Michigan is one of the foremost states in the production of sugar.

Raising live stock is an important industry and large numbers of cattle, hogs and sheep are found throughout the state. Among the states east of the Mississippi, Michigan is second only to Ohio in the production of wool. Dairying is extensively carried on and the yearly income from the dairies is about $17,000,000. The income from poultry and eggs is about $11,000,000.

Fisheries. The position of Michigan with reference to the Great Lakes and her numerous inland lakes make the fishing industry an important one. The most numerous fish taken from the Great Lakes are trout, herring, whitefish and perch. State and Federal hatcheries are found within the state and there are numerous laws designed for the protection of the fishing industry.

Manufactures. Within the last few years manufacturing has developed rapidly and Michigan is an important manufacturing state. Grand Rapids is the largest center in the world for the manufacture of furniture and sticky fly paper. Another important center for furniture is Muskegon. A very important branch of the furniture business is the manufacture of filing systems for offices and of sectional bookcases. Prepared foods are manufactured in large quantities in and around Battle Creek.

Detroit, Flint and Lansing are noted for the manufacture of automobiles, and in Detroit, which is the chief industrial center, stoves, chemicals, leather, boots and shoes and numerous other articles are manufactured. There are shipyards at Detroit, Port Huron and Wyandotte. In the Detroit yards are built some of the largest ships on the Great Lakes. At Belding are valuable silk mills. In Bay and Saginaw counties there are extensive salt works.

Summer Resorts. Michigan's delightful summer climate, beautiful lakes and pleasing landscapes and her proximity to Chicago and other large cities make her one of the most popular states in the Union for summer recreation. Within her borders are found resorts which have attained a wide reputation. Foremost among these is Mackinac Island, long celebrated for its beauty and its historical associations and as a social center during the tourist season. During the summer this is one of the most important passenger ports on the

Great Lakes. Other places of note are Petoskey, Ludington, St. Joseph, Benton Harbor, South Haven and Saugatuck. The shores of many of the inland lakes are lined with cottages which are the summer homes of thousands of people from large cities, who seek rest and recreation within the quietude of these beautiful bodies of water.

TRANSPORTATION AND COMMERCE. The cities and large towns on the shore of Lake Michigan have direct connection with Chicago by steamer, and Grand Haven and some other cities have similar connection with Milwaukee. Alpena, Bay City, Saginaw and other towns on Lake Huron have steamer connections with Detroit, Toledo, Cleveland, Buffalo and Mackinac Island. The Detroit River is the busiest waterway in the world, carrying more shipping than any other body of water, notwithstanding that it is open to navigation only eight months in the year. At Sault Ste. Marie is the greatest lock in the world, with the exception of that on the Isthmus of Panama, and the shipping there exceeds that on the Suez Canal. Both the Upper and Lower peninsulas are well supplied with railways extending through them in all directions. In the Lower Peninsula the principal systems are the Michigan Central, the Lake Shore & Michigan Southern, the Grand Trunk, the Pere Marquette and the Grand Rapids & Indiana. In the Upper Peninsula are the Chicago & North Western, the Chicago, Milwaukee & St. Paul and the Soo. These systems with their cross lines and a few local lines provide the state with ample railway facilities. Detroit is the chief railway and commercial center. Grand Rapids is next in importance, and Battle Creek, Kalamazoo, Lansing and Saginaw are also important railway centers. In the southern part of the state numerous electric lines connect adjoining cities.

The commerce of the state consists chiefly in supplying surrounding markets with the agricultural products, including dairy products, fruits and vegetables, and with various manufactured goods. Some of these manufactures, however, such as furniture, automobiles, stoves and boots and shoes, are sent to all parts of the country. The imports consist of coal, raw material for manufactures, textiles and such other manufactured products and foodstuffs as cannot be produced with profit within the state.

GOVERNMENT. The present constitution was adopted in 1909. The executive department consists of the governor, lieutenant-governor, secretary of state, auditor, attorney-general, treasurer and superintendent of public instruction, all elected for two years. Boards of commissioners and many state officers are appointed by the governor. The Legislature consists of the Senate of 32 members and the House of Representatives of 100 members, all elected for two years. The sessions are biennial and are unlimited.

The judicial department consists of the Supreme Court of eight judges elected for eight years, one being elected every two years, and a Circuit Court for each judicial district, with one or more judges elected for six years. There is a Probate Court in each county and justice courts are provided in each township.

EDUCATION. The public schools are under the general supervision of a state superintendent of public instruction and the schools in each county are under the direction of a county commissioner, elected for four years. Each county has a board of examiners consisting of the county commissioner and two members appointed by the county supervisors. This board grants certificates to teachers within the county. There are also township boards of education and each district has a board consisting of three or five members. The graded schools throughout the state are excellent and the rural schools maintain a high standard and are taught by trained teachers. The teachers' college at Ypsilanti is the oldest normal school west of New York. State normal schools for training teachers of the elementary schools are maintained at Kalamazoo, Mt. Pleasant and

Marquette. The state university, one of the best in the Union, is at Ann Arbor. The agricultural college is at Lansing and the state school of mines is at Houghton.

The leading educational institutions not under control of the state are the Detroit College, Albion College, Adrian College, Alma College, Hillsdale College, Kalamazoo College, Olivet College, and Hope College at Holland.

STATE INSTITUTIONS. The hospitals for the insane are at Kalamazoo, Pontiac, Traverse City and Newberry. The school for the deaf and dumb is at Flint and that for the blind is at Lansing. The state public school for dependent children is at Coldwater. The home for the feeble-minded is at Lapeer. The state soldiers' home is at Grand Rapids. The penitentiaries are at Jackson and Marquette. There is a house of correction at Ionia, an industrial school for boys at Lansing and an industrial school for girls at Adrian.

CITIES. The chief cities are Lansing, the capital; Detroit, Grand Rapids, Saginaw, Bay City, Flint, Kalamazoo, Muskegon, Port Huron, Battle Creek and Manistee in the Lower Peninsula; Laurium, Ishpeming, Marquette, Escanaba, Menominee, Hancock and Ironwood in the Upper Peninsula.

HISTORY. Michigan, named for the lake, the Algonquin "great sea," was visited as early as 1610 by French Jesuits and traders. A mission, temporarily founded at Sault Ste. Marie in 1641, was renewed by Marquette in 1668. Three years later St. Ignace was settled, Detroit following in 1701. By the Treaty of 1763, the territory passed into the hands of the English. Then Pontiac's followers destroyed Mackinac and besieged Detroit for weeks. In 1774 the territory became part of Quebec, only to revert, in 1783, to the United States. After having been a part, in turn, of the territories Ohio and Indiana, what is now the Lower Peninsula of Michigan was cut off from Indiana and organized independently, 1805. Michigan was conspicuous in the War of 1812. Instead of a strip of 600 sq. m., including Maumee Bay and Toledo, which Ohio and Michigan both wanted, Michigan was given its Upper Peninsula. Jan. 26, 1837, it became a state; during the decade up to 1840, its population grew from 30,000 to 212,000. In 1847 the capital was moved from Detroit to Lansing. By a constitutional amendment of 1853, the manufacture and sale of intoxicants was prohibited. This was repealed in 1876, but by virtue of a local option law about one-half the counties prohibited the sale of intoxicating liquors. Michigan sent about 91,000 men to the Union armies during the Civil War. Since that time its chief concerns have been taxation and the regulation of corporations, due to its rapid industrial development. Consult Cooley's *Michigan.*

GOVERNORS. Stevens Thompson Mason, 1835-1840; William Woodbridge, 1840-1841; James Wright Gordon, 1841-1842; John Steward Barry, 1842-1846; Alpheus Felch, 1846-1847; William L. Greenly, 1847-1848; Epaphroditus Ransom, 1848-1850; John Steward Barry, 1850-1851; Robert McClelland, 1851-1853; Andrew Parsons, 1853-1855; Kinsley S. Bingham, 1855-1859; Moses Wisner, 1859-1861; Austin Blair, 1861-1865; Henry Howland Crapo, 1865-1869; Henry Porter Baldwin, 1869-1873; John Judson Bagley, 1873-1877; Charles Miller Croswell, 1877-1881; David Howell Jerome, 1881-1883; Josiah W. Begole, 1883-1885; Russell Alexander Alger, 1885-1887; Cyrus Gray Luce, 1887-1891; Edwin Baruch Winans, 1891-1893; John T. Rich, 1893-1897; Hazen Smith Pingree, 1897-1901; Aaron Thomas Bliss, 1901-1905; Fred M. Warner, 1905-1911; Chase S. Osborn, 1911-1913; Woodbridge N. Ferris, 1913—. Russell A. Alger later served as secretary of war.

**Michigan City, Ind.,** a city of Laporte Co., 40 m. s.e. of Chicago, on Lake Michigan and on the Lake Erie & Western, the Pere Marquette, the Michigan Central, the Chicago, Indianapolis & Louisville and other railroads. The excellent transportation facilities contribute to the commercial and in-

dustrial growth of the city. It has a large trade in iron ore, lumber and salt, and extensive manufactories of railroad cars, furniture, barrels, hosiery, knit goods, shirts, gloves and lumber products. The workshops of the railroads which converge at this point are located here. The city contains the Northern Indiana State Prison, a United States life-saving station and a public library. During the summer it has steamboat connection with Chicago, and it is a popular excursion point and summer resort. It was settled in 1833, incorporated in 1837 and received a city charter in 1867. Population in 1910, 19,027.

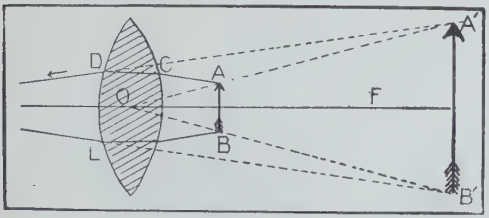
**Michigan, University of,** at Ann Arbor (1837). This university was established by the first Legislature of the state and opened to students in 1841. It maintains departments of literature, science and arts, law, medicine, surgery, engineering, pharmacy, dentistry, forestry and a graduate school. The first four of these departments were the ones originally established. The university is controlled by a board of eight regents elected, two biennially, by the people of the state. It has a library of over 300,000 volumes and property valued at $5,000,000. The University of Michigan was the first of the state universities as the term is now understood, and has led in the development of a broad and democratic spirit in secondary, higher and professional education; it was the first great university to become coeducational, admitting women in all departments upon an equal footing with men in 1870. In these and in many equally progressive movements it has made its influence felt in all parts of the world. Aside from the usual college buildings, there are allopathic and homeopathic hospitals, separate gymnasiums for men and women, well-equipped botanical gardens, and an observatory which maintains a branch in South America below the equator. The state schools of mines and of agriculture are at present under separate management, but their enrollment, about 1500, should be added to the 5000 of the university when comparison is made with other state universities. See ANGELL, JAMES BURRILL.

**Micrometer,** *Mi krom' e ter,* a device which makes it possible to determine measurements of length more accurately than by using an ordinary rule or scale. It is employed in telescopes and microscopes as well as on surveying instruments, and forms a very useful tool for the machinist by which he can measure the diameter of shafts, etc., to an exactness of one-thousandth part of an inch. Micrometers are made in a variety of forms, but they consist principally of a very finely threaded, slender screw whose revolutions are counted or measured, or indicated on a scale. See MICROSCOPE; TELESCOPE.

**Microphone,** *Mi' kro fone,* an instrument for measuring the intensity of low sounds. One of the earliest forms of microphones was devised by D. E. Hughes in England in 1878, and consisted essentially of a rod of gas carbon standing upright, with its lower end resting on a carbon button and its upper end held by a carbon collar. These carbons resting on a resonance box coupled to a vibrating sounding board formed part of an electric current, which included also a telephone. This contrivance was made so sensitive that the tread of a fly on the resonance box could be distinctly heard. The modern telephone transmitter is essentially a microphone. See TELEPHONE.

**Microscope,** *Mi' kro skope,* an optical instrument for magnifying small objects. Microscopes are simple and compound. A simple microscope consists of a double-convex lens, usually so mounted that it is easily carried. The common pocket magnifier is a simple microscope (See LENS, subhead *Convex Lens*). With the simple microscope one views the object directly, and it is very effective for examining insects, flowers and other common objects; its magnifying power, however, is comparatively low, seldom exceeding 20 diameters, which is equivalent to increasing the surface 400 times. The illustration shows how the simple microscope magnifies. Light from the

object A B is refracted by the lens twice in the same direction, once on entering the lens as at C, and once on leaving it, as D and E. Rays entering the lens at the center O are not refracted. The eye follows the refracted rays back in




SIMPLE MICROSCOPE

a straight line to where they meet the rays from O, and there the magnified image A'B' is seen.

The compound microscope consists of an object glass and an eyepiece. These are mounted in tubes so fitted that the tube containing the eyepiece slides within that holding the object glass. The tubes are attached to a stand, which contains a stage for holding the object, beneath which is a small convex mirror for reflecting light upon the object. The stand contains a rack and pinion and a screw with a very fine thread, both of which are used in focusing the instrument. The object glass, or objective, forms a magnified image of the object, and the eyepiece forms a magnified image of this image. By extending the tube and thus increasing the distance between the objective and the eyepiece, the magnifying power of the instrument is increased. It may also be increased by increasing the power of the objective and of the eyepiece. Most compound microscopes are equipped with three objectives and one eyepiece, but this number can be increased if desired.

The microscope is in general use for determining adulterations in foods, the quality of steel, bacteria in disease, and for many other purposes.

**Mi'das,** in Greek and Latin myths, King of Phrygia. For finding and returning to Bacchus the latter's teacher, Silenus, the god granted him one wish. King Midas chose that whatever he might touch would turn to gold; but when he found that all his food became shining metal, he feared starvation and implored Bacchus to deliver him from golden destruction. Bacchus instructed Midas to bathe in a certain stream, and the golden touch left him upon his complying.

Thenceforth Midas hated wealth. He betook himself to the country, where he became the friend of Pan. In a musical contest between Apollo and Pan, Midas preferred the rustic melodies of the latter. This so angered Apollo that he transformed the King's ears into those of an ass. Midas hid his shame from all but his barber, whom he swore to secrecy under penalty of dire punishment. The barber, however, could not keep such interesting news; digging a hole in the earth, he whispered the story into it and covered it over, safely hidden, as he thought. Shortly afterward reeds sprang up on the spot. Swaying in the breezes, they murmured to all who passed by, "King Midas has ass's ears, ass's ears."

**Middle Ages, The,** a period of history extending from 476, the fall of the Roman Empire, to the beginning of the modern epoch, about 1450. The first centuries were called the Dark Ages, as the civilization of the ancient world seemed entirely submerged in the barbarism of the invaders of the Roman Empire. The feudal system was the main bond connecting the different classes of society, and war was the noblest profession of the times. Charlemagne lived in the last part of the eight century, and under him there was a revival of learning, which developed into the Scholasticism of the 12th and 13th centuries. The development grew more rapid in the 14th and 15th centuries and was in full tide in the 16th, the century of the Reformation and the Renaissance.

**Mid'dleborough, Mass.,** a town and summer resort of Plymouth Co., 34 m. s.e. of Boston and 18 m. n.e. of Fall River, on the Nemasket River and on the New York, New Haven & Hartford Railroad. The town contains the

villages of North and South Middleborough, Nemasket, Four Corners, Waterville, Eddyville, Puddingshire, Rock and Thomastown. Three falls in the Nemasket River afford excellent water power for manufacturing purposes. The industrial interests are represented by boot and shoe factories, woolen mills, parlor-grate works, tile and varnish factories, an iron foundry and saw and planing mills. The town was settled in 1662 on the site of the Indian village, Nemasket, and is one of the oldest towns in the state, having been incorporated in 1669. Population in 1910, 8214.

**Middlesboro, Ky.,** a city of Bell Co., 64 m. n.e. of Knoxville, near the Tennessee border line, on the Southern, the Louisville & Nashville and other railroads. It is a mining and manufacturing city, with distilleries and ironworks and extensive coal and coke interests. The city is much frequented as a summer resort. Population in 1910, 7305.

**Middletown, Conn.,** a city and county seat of Middlesex Co., 16 m. s. of Hartford, on the west bank of the Connecticut River and on the New York, New Haven & Hartford Railroad. It is connected with Portland on the opposite side of the river by an unusually long drawbridge. Middletown is situated in an agricultural region and the excellent water power has aided in making the place a manufacturing city. The river is navigable as far as Hartford for small vessels. The manufacturing establishments include bone goods, cotton webbing, pumps, hydraulic machinery, wool, cotton, silk and rubber goods, harness trimmings, bicycles, automobiles and marine hardware.

Middletown is the seat of the Wesleyan University (Methodist), founded in 1831, and of the Berkeley Divinity School (Protestant Episcopal). There is also an industrial school for girls. The Russell Free Library is located here. On a high hill about a mile southeast of the city are the imposing buildings of the Connecticut State General Hospital for the Insane. Previous to the Revolution and some time thereafter Middletown was an important commercial port, having considerable trade with the West Indies. It was settled in 1650 and a year later was incorporated as a town under the name of Mattabeseck. The name was changed to Middletown in 1653. It was given a city charter in 1784. Population in 1910, 20,749.

**Middletown, N. Y.,** a city in Orange Co., 67 m. n.w. of New York City, on the Wallkill River and on the New York, Ontario & Western, the Erie and the New York, Susquehanna & Western railroads. It has fine public buildings and is the seat of the New York State Homeopathic Hospital for the Insane. An old ladies' home is also located here. Among its industrial establishments are car shops, straw-hat factories, saw and file works, cigar factories, milk condenseries, tanneries and wood-type and cut-glass factories. It was settled before the Revolution and named from its central location on the old Minisink road leading to the "Far West" of New York State. Population in 1910, 15,313.

**Middletown, Ohio,** a city of Butler Co., 34 m. n. of Cincinnati, on the Miami River, the Miami and Erie Canal and on the Cincinnati, Hamilton & Dayton and the Cleveland, Cincinnati, Chicago & St. Louis and other railroads. It has large manufactories of bicycles, tobacco, paper, sheet steel, agricultural implements, flour and dairy products. The Miami River affords excellent water power and has contributed largely in making Middletown a manufacturing city. It was settled in 1794. Population in 1910, 13,152.

**Midge,** *Mij,* a family of slender insects of the order Diptera. There are in all 18 species, seven of which are known in the United States. The larvæ may be seen in the swift currents of streams, where they lie close to the rocks and feed upon aquatic vegetation. Later they fasten themselves to the rock and become flattened, inactive pupæ. When ready to mature, the pupa case divides and rises slowly to the surface, where the adult gradually unfolds its narrow wings. The midges may be seen at twi-

light dancing in large swarms near the shores of ponds and small lakes. The name is often wrongly applied to any small and harmless but annoying insect. See DIPTERA.

**Miff'lin, Thomas** (1744-1800), an American Revolutionary patriot, born in Philadelphia. In 1772-74 he served in the State Legislature, and in 1774 was a delegate to the First Continental Congress. Enlisting in the army, he served during the Revolutionary War, and attained the rank of major-general. He was opposed to Washington's military policy, and was prominent in the Conway Cabal. In 1782 he was elected to Congress, in 1785 he entered the State Legislature again, and in 1787 he was a delegate to the Federal Constitutional Convention. He was governor of Pennsylvania from 1790 to the time of his death. See CONWAY CABAL.

**Mignonette,** *Min" yun et'*, a fragrant herb of the Mignonette Family. It is a garden or house plant, with leaves varying in shape from round to oblong. The flowers of the common species grow in a spike and are greenish-white in color. Dyers' mignonette has a yellow flower, from which a yellow dye is made.

**Migra'tion,** as generally understood, the movement of large bodies of animals from one country to another or from one section to another for purposes of feeding or of breeding. The best known of such migrations are those of birds, which are of regular, annual occurrence (See BIRDS, subhead *Migration*). Birds are by no means the only animals that migrate, however. At the breeding season marine fish take to the coastal streams and fresh-water fish go to the deep sea to spawn.

The majority of migrations are for the purpose of finding new feeding grounds. Thus, in the great plagues of grasshoppers and locusts which often descend upon the agricultural states destroying every bit of green in sight, the number of the insects makes their constant advance necessary in order that food may be provided. The trails of antelopes, reindeer, hares, marmosets, elephants, chamois and the once common bison show the migrations of these animals when climatic conditions or change of season forced them to seek new fields. The sudden appearance of vast hordes of rats and mice and an overwhelming plague of bats are due, no doubt, to the same cause. Many insects, being light of body and small of size, are frequently blown by the wind, carried in wood or imported upon nursery stock and so carried from place to place. Such immigration is not truly migration, which is a wholly voluntary movement. One of the most unexplainable migrations is that of the lemmings in the Scandinavian Peninsula, since it costs the lives of the majority of the participants. See LEMMING.

**Mi'lan,** the chief city of Lombardy, the second largest city of Italy and the capital of the Province of Milan. It is situated on the great plain of Lombardy, on the Olona River, 166 m. w. of Venice. The changeable climate, with alternating hot winds in summer and cold winds from the frozen Alps in the winter, is somewhat trying. Excellent promenades and boulevards are maintained, among others the magnificent Via Dante. The New Park, once a national drill-ground, which contains the Anfitheatro dell' Arena, built by Napoleon I, has extensive promenades and a large pond, and is lighted by electricity. There are numerous beautiful churches, including the Gothic Cathedral, famous the world over, and comparable with the Cathedral of Santa Maria del Fiore at Florence and St. Peter's at Rome; the Church of Sant' Ambrogio, the Dominican Church of Santa Maria delle Grazie, containing the famous painting of the *Last Supper* by Leonardo da Vinci; the Church of San Giorgio al Palazzo; and the San Nazaro and San Sebastiano. The secular buildings include the Palace of Arts and Sciences (formerly the Brera Palace), with its extensive national library, the Borromeo Palace, the Royal Palace and the Archiepiscopal Palace, the Palace of Justice, the Exchange, the large Scala Theater and the famous

Conservatory of Music (Milan being the center of music of the country).

Milan possesses great wealth and is the chief financial city of Italy. The manufactures include leather, woolen goods, silk, machinery, furniture, glass and chemical products. Cheese, butter, eggs, poultry and grain are also marketed. The city is the center of the Italian book trade, and leads in modern sculpture. It contains the royal mint, a corn exchange and a tobacco factory.

Milan has been known to history since 222 B. C., when it was subdued by the Romans. In the third century A. D. Diocletian made it the capital of Italy. Constantine issued from Milan, in 313, the edict recognizing Christianity, and as the seat of a bishop it was long the home of the famous Ambrose. It obtained and held republican liberties until the 12th century and was the strongest among the city republics. Among its most famous princes were the Sforzas, well known for their patronage of learning and art, as well as for their cruelty. Milan became a Spanish possession in 1535, was later ceded to Austria, became the capital of the Cisalpine Republic under Napoleon in 1797 and the capital of the Napoleonic Kingdom of Italy in 1805. It was restored to Austria ten years later. In 1859 the Austrians yielded the city to Napoleon III after the Battle of Magenta, and he surrendered it and the whole of Lombardy to Sardinia. Population, about 492,000.

**Milan Cathedral,** a famous Gothic cathedral in Milan. Its form is that of a Latin cross, and it has a length of 486 ft. and a breadth of 287 ft. The tower is 356 ft. in height and commands a splendid view of the city, the Province of Lombardy and the distant Alps. The exterior of the cathedral is of white Carrara marble and the carvings are of unsurpassed beauty; it contains more than 2000 statues and 98 pinnacles. The foundation was laid by Gian Galeazzo Visconti in 1386, and the talents of the best European architects have contributed towards its perfection. Napoleon was crowned King of Italy within its walls in 1805.

**Milan Decree,** a decree issued by Napoleon Dec. 7, 1807, ordering the confiscation of any American vessel which submitted to search by a British ship, or which sailed for or from any port of Great Britain or her colonies. This order was in retaliation for the British Orders in Council, issued Nov. 11 of the same year and forbidding direct trade by the American colonies with any European country under Napoleon's control. These two decrees practically closed all European ports to American ships. To offset them Congress passed the Non-Intercourse Act, which was in force for about two years, but failed to secure the repeal of the obnoxious decrees.

**Milburn, William Henry** (1823-1903), an American clergyman, born in Philadelphia and educated at Illinois College. When five he lost the sight of one eye by an accident, finally becoming totally blind. In 1843 he was ordained a Methodist preacher. He had circuits in Illinois and various Southern States; later, for a time, he was deacon in the Episcopal Church but returned to the Methodists in 1871. He was chaplain of each house of Congress several times. In the interest of his work he traveled some 1,500,000 miles in America and Europe and lectured and wrote extensively. He was known as the "Blind Man Eloquent."

**Mil'dew,** popularly a name given to any mold which attacks plants or any animal or vegetable matter; scientifically, a mildew is a plant disease caused by a certain family of fungi and easily distinguished by the cobwebby network which it forms upon the leaves. It is sometimes parasitic, living upon growing plants, and sometimes saprophytic, living upon dead organic matter. The most common is that familiarly seen upon the leaves of the lilac. It appears first as a small gray-white patch, which soon changes to yellow, brown and then black. This or a similar mildew attacks a variety of plants: trees, like the maple,

elm, beech, oak and basswood; shrubs, like the willow, huckleberry, hawthorn and gooseberry; vines, like the grape, Virginia creeper and hop; and herbs, like the dandelion, cocklebur and almost all weeds. Cherries and plums sometimes suffer from an allied fungus disease. Mildews are not especially troublesome except upon fruit-bearing plants, and there they are easily checked by care and attention. Consult Massee, *A Text-Book of Plant Diseases;* United States Department of Agriculture, *Bulletin 11;* Marshall Ward, *Diseases of Plants.* See BLIGHT; FUNGICIDE; INSECTICIDE.

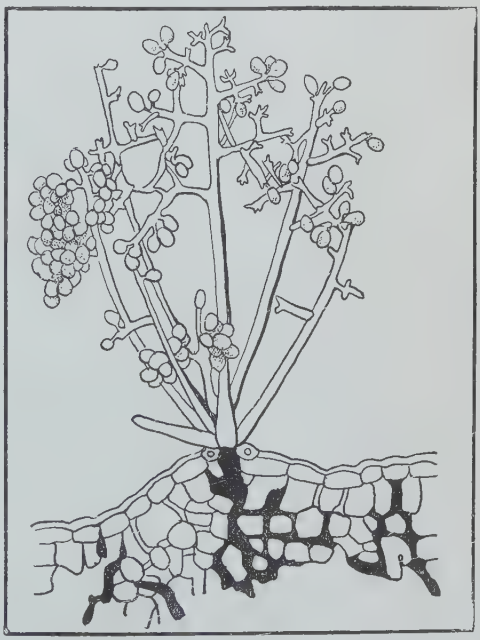
POWDERY MILDEW OF ROSES

**Mile.** See WEIGHTS AND MEASURES.

**Miles, Nelson Appleton** (1839- ), an American soldier, born in Westminster, Mass. He engaged in mercantile business in Boston until the opening of the Civil War, when he entered the Federal army as a volunteer, and in October, 1865, was promoted major-general. After the war he conducted a number of campaigns against the Western Indians. In 1895 he entered into full command of the United States army, and held that position during the war against Spain. As lieutenant-general he was retired in 1903. Two years later, however, he was appointed temporary commandant of the Massachusetts militia, on the governor's staff. At various times General Miles represented the army at the seat of war between Turkey and Greece and at Queen Victoria's Diamond Jubilee. He has written much for magazines, and there have recently appeared his memoirs of civil and military life, under the title *Serving the Republic.*

**Mil'ford, Mass.,** a town of Worcester Co., 18 m. s.e. of Worcester, on the Charles River and on the Boston & Albany and the New York, New Haven & Hartford railroads. Milford is noted as a manufacturing center, the products including straw goods, silk, boots and shoes, machinery, needles, thread, boot- and shoe-trees and bone cutters. The granite quarries in the vicinity contribute largely to the industrial wealth of the town. There is a high-school building and a memorial hall. Milford was settled in 1669 as a part of Mendon but was incorporated as a separate town in 1780. Population in 1910, 13,055.

**Military Academy, United States,** a school for the education of officers for the United States army. This academy is beautifully situated at West Point,



DOWNY MILDEW OF GRAPE

N. Y., on the west bank of the Hudson River, about 50 m. north of New York City. It occupies 2300 acres of a plateau 180 ft. in elevation, surrounded by

hills from 500 to 1500 ft. high. It was founded in 1802; its power and capacity were increased in 1808; and in 1903, $5,500,000 was appropriated for its extension, making it one of the finest institutions of its kind in the world.

The students are called cadets and are recruited as follows: one from every congressional district, one from each territory, one from the District of Columbia, one from Porto Rico, two from each state at large and 40 from the United States at large. Each of these must be a resident of the district or state from which he comes. The selection of cadets is made by holding a competitive examination on the first of May in the region where a vacancy has occurred. Those who pass the examinations in English, geography, American history and elements of mathematics, and who stand a severe physical test, form the body from which recommendations are made by Congress to the president, who appoints as many as may be required to fill vacancies.

The course of study requires four years. The cadet has $500 a year and one ration a day. He is not allowed to receive money or provisions from outside. He has a furlough after two years, which is the only time during his course that he gets out into the world. He graduates a second lieutenant in the regular army and must serve eight years.

The academy is under a superintendent, who is an army officer; and there are about 80 instructors, who are also army officers, those of them who teach military science and tactics being detailed every four years by the secretary of war. Classes are composed of about ten cadets, who are required to recite every day in each branch pursued. The instruction is very thorough, and the ideals of life are high.

**Militia,** *Mi lish' a,* ordinarily a body of citizens armed and trained for military services, but not engaged in such service except in case of emergency. In its broadest application the term includes all able-bodied male citizens of a country between specified ages. In Great Britain the organized militia constitutes the second line of the army. In the United States all able-bodied citizens between the ages of 18 and 45 are included in the militia, numbering over 15,000,000.

In the United States the militia is divided into two classes, the organized, known as the National Guard, and the reserve. The National Guard is organized under the governments of the states, each of which maintains one or more regiments. The instruction, drill and plan of organization are the same as those in the regular army. The National Guard can be called out by the governor of the state to suppress riots and maintain order within the state. They are also subject to the call of the president whenever he considers that conditions make the call necessary. When called out by the president, the National Guard becomes a part of the regular army, and the troops remain in the service for the term specified in the call, unless relieved by the president. In 1912 there were in the National Guard 9437 officers and 122,377 men. See ARMY, UNITED STATES.

**Milk,** the white fluid secreted by females of Mammals for the nourishment of the young. For commercial purposes that produced by cows, goats, sheep and asses is made use of in many countries, although only that of cows is used to any extent in the United States. Milk is a watery liquid containing many tiny globules of fat, which, being lighter than the liquid in which they are borne, rise to the surface and constitute the cream; with them rise the proteids, casein and albumin which are contained in fresh milk. Although at the proper temperature the cream will rise in a few hours' time, the process may be hastened by means of a cream separator, or centrifuge (See CREAM SEPARATOR). Every 100 lb. of good milk contains 87 lb. of water, 4 lb. of fat, 1⅓ lb. of casein and albumin and 5 lb. of milk sugar. It requires 5½ gallons of milk to produce a gallon of cream, 1⅓ gallons to make a pound of cheese, and 3½ gallons to make a pound of butter.

If milk is allowed to stand at a temperature above 45° F., it will sour within 24 hours; the souring is a process of fermentation caused by a bacterium, or tiny plant, which enters from the air and the dust of house or barn, and in the course of its growth changes the milk sugar to lactic acid. When seven-tenths of one per cent of the milk has become acid, the milk coagulates and is said to be sour. Since these bacteria are present in all dust and impurities, all milk containers must be kept scrupulously clean, or, since the bacteria grow very slowly at low temperatures, milk kept below 40° F. seldom sours before it is used. Milk may be sterilized, that is, the bacteria in it may be destroyed, by keeping the milk at the boiling point for some time. This, however, also changes other properties of the milk and decreases its value, so the process generally employed is pasteurization, named after the great investigator of bacteria, Louis Pasteur. Pasteurization is accomplished by heating milk to a temperature of 140° F. for 20 minutes or to a higher temperature for a shorter period and then quickly cooling it. The addition of chemicals to prevent souring of milk is prohibited in most states of the United States, since chemicals decrease the digestibility of the milk and often affect the health of persons, especially infants, drinking it.

Milk from diseased animals should never be used unless properly sterilized, and as milk readily absorbs germs of contagious diseases, especially typhoid fever and scarlet fever, there is great danger in the spread of disease by milk not properly cared for; barns, dairies, cattle and dishes must be kept absolutely clean, and milk that is to be shipped any distance should be shipped in cars where the temperature may be kept below 40° F.

The products of milk are condensed milk and cream, malted milk, butter, cheese and, less commonly, a hard substance known as milk stone, which is used as a substitute for celluloid and ivory. There is an average of 7,728,600,000 gallons of milk produced in the United States annually. See Dairy Husbandry; Butter; Cheese.

Condensed Milk. Condensed milk is prepared by evaporating milk until about three-fourths of the water is expelled. The process is carried on in factories, to which large quantities of milk are delivered. From the storage tanks the milk is run into copper vessels holding about 1000 gallons, which is brought to a boiling point by steam heat. It is then strained and run into another vessel, called the sugar mixer, where the proper quantity of granulated sugar to preserve it is added. The milk is then placed in vacuum pans, where the evaporation is completed at a low temperature, about 140°. The condensed milk is then drawn off and placed in tin cans, which are sealed air-tight. Condensed milk has the consistency of cream, for which it is extensively used as a substitute, by camping parties, and in localities where milk is not easily obtained.

**Milk Snake**, or **Chicken Snake**, a harmless snake of the Colubrine Family, common in the United States from Iowa, north and east. Its general color is gray spotted with chestnut; its length is from two to three feet. It has received its popular names because it was supposed to feed upon milk and steal it from the dairy cans. Its chief food, however, consists of mice and other small Rodents. Milk snakes are tamable and are said to make amiable pets.

**Milk Tester**, an apparatus designed to test the amount of butter fat in milk. The Babcock tester, which was the first successful tester and is the one commonly in use at present, makes use of the fact that the proteids, which under ordinary conditions have a great affinity for butter fat, may be removed from the milk by means of sulphuric acid. This leaves the butter fat free in a watery liquid, from which it readily separates. The Babcock tester consists of a number of radiating arms set in a revolving spindle; at the end of each arm is a graduated test tube, into which the

proper proportions of milk and sulphuric acid are introduced. At the rapid revolutions of the spindle the cream is separated from the milk, and the sulphuric acid combines with the proteids. The amount of the butter fat may then be "read" from the graduations. This tester is universally used in dairies and creameries and enables even an amateur to make reliable tests. See CREAM SEPARATOR.

**Milk Tree.** See COW TREE.

**Milk'weed",** a name given to a large number of plants of the Milkweed Family, all characterized by having a thick, milky juice and odd, irregular flowers.

MILKWEED

In general, the milkweeds are low, roadside or field weeds having ordinary foliage, generally linear or oblong in form. The stems are erect and frequently hollow, often, too, covered with soft, downy hairs. The flowers may be bright orange, red, pink, magenta, greenish, white, yellow or purple in color, but are outwardly very unlike. They grow in umbrellalike or flat-top clusters, and each individual blossom has a little green calyx, with five pointed lobes bent back abruptly. The corolla is also five-lobed. The fruit is a double pod in which each seed has a long tuft of soft, silky down at the end. To this class belong the butterfly weed, or pleurisy root, swamp milkweed, four-leaved milkweed, and the common milkweed whose soft down is seen floating through the air in autumn and whose prickly, swollen pods are very artistic as they hang on the withered stalks.

Other milkweeds have twining stems and often a flat crown, or corona, covering both calyx and corolla. In this class are the wax plant, a cultivated weed and some dooryard varieties. The cactuslike milkweeds are low plants, cultivated in greenhouses as curiosities. The commonest of this class is the hairy stapelia, a native of South Africa.

The milkweeds are all alike in having the tops of the stamens peculiarly connected with the pistil, and the pollen adhering to them in sticky masses instead of scattering in a fine dust as does that of most plants. The plants are found as weeds in all parts of the United States and Canada.

**Milky Way,** or **Gal'axy,** a band of whitish light of irregular form, making a complete girdle of the celestial sphere. Under the telescope the Milky Way is seen to be composed of innumerable stars of small magnitude, perhaps because of enormous distance, so closely clustered in many places as to be countless. In one part are two decided branches which reunite. Some parts are full of dark places, among which, one in the South Polar regions, long called by sailors the "coal sack," is notable. Many theories have been advanced to account for the Milky Way, but no one of them has proven wholly satisfactory. See PLEIADES; STARS; CELESTIAL SPHERE; TELESCOPE.

**Mill, John Stuart** (1806-1873), an English scholar and author, recognized by his countrymen as the foremost philosopher and political economist of the time. He was born in London, and was educated under his father's direction. At 15 he spent a year in France; but he had already gained an extraordinary knowledge of Latin, Greek, mathematics, history and science. At 17 he became a clerk under the East India Company, retiring 35 years later from an important position with a pension of £1500, when India was transferred to the British Government. After 1858 he gave all his time to authorship and public service, which had long claimed his interest and part of his time. He became a member of Parliament in 1865, acting with the advanced Radicals.

Mill may be regarded as the final exponent of the empirical and utilitarian school of philosophy which began with John Locke, and his influence on English thought in the 19th century was very great. "How to unite the greatest individual liberty of action with a common ownership in the raw material of the globe and an equal participation of all in the benefits of combined labor"—seemed to him the problem of the future. His chief works are *A System of Logic* and *Principles of Political Economy*. Among other writings are *The Subjection of Women, Three Essays on Religion* and *Thoughts on Parliamentary Reform.*

**Millais,** *Mil la',* **Sir John Everett** (1829-1896), an English painter, born at Southampton, of an old Jersey family of Norman descent. In 1848, together with William Holman Hunt, he initiated the Pre-Raphaelite movement. Their aim was to return to the simplicity of the early Italian painters, and to present on canvas what they saw in nature. The first work of Millais as an exponent of the new art elicited severe abuse, and he was championed by Ruskin. His themes were highly imaginative and showed refined conception and beautiful execution. He illustrated among other subjects Trollope's novels and *Tennyson's Poems,* and in 1863 was elected to membership in the Royal Academy, later succeeding Lord Leighton as president. His last 25 years were devoted to painting portraits and nature and the world about him. Among his most splendid canvases are *A Yeoman of the Guard,* excellent for color; and *The Northwest Passage,* remarkable for its broad treatment of a descriptive subject, splendid draughtsmanship and compelling interest.

**Miller, Cincinnatus Heine** (1841-1913), better known as Joaquin Miller, an American poet, born in the Wabash District, Ind. With his parents he moved to Oregon in 1854, became a miner in California, lived among the Indians of the Pacific coast, and turned from law to journalism, serving as editor of the Eugene (Ore.) *Democratic Register.* His early poems were unrecognized in America, but upon his going to England he soon became the "lion" of London society for a short time. On his return to America he continued his journalistic work in New York City, Washington, D. C., and Oakland, Cal. His poetry is highly romantic and full of tropical passion; it is brilliant at times, but is never marked by distinct artistic excellence. He wrote *Songs of the Sierras, Songs of Italy, Building of the City Beautiful* and *The Danites in the Sierras,* a novel.

**Miller, Hugh** (1802-1856), a noted Scottish author and geologist, born in Cromarty. He was a journeyman mason in various parts of Scotland, and in 1829 published his first volume of poems. His study of geology was fruitful and he wrote freely, both literary and scientific essays. Among his writings are *Poems Written in the Leisure Hours, The Old Red Sandstone, Footprints of the Creator* and *Testimony of the Rocks.*

**Mil'let,** a species of grain of the Grass Family raised in Eastern countries as a forage plant. It produces sprays of flowers which are succeeded by roundish seeds used as food for poultry. Many species are raised in the United States but not to any great extent. Rus-

sia and Japan lead in the production of millet, and in those countries it is used both as food and forage. See KAFIR CORN.

**Millet, Francis Davis** (1846-1912), an American painter and writer, born at Mattapoisett, Mass., and educated at Harvard. He served in the Civil War as a drummer and assistant surgeon. In 1871 he began his European studies at the Royal Academy of Fine Arts at Antwerp, and also studied in France and Italy. He served as war correspondent for the New York *Herald* and the London *Daily News* during the Russo-Turkish War of 1877-78, and represented the London *Times* and *Harper's Weekly* in the Philippines during the Spanish-American War. As an artist, he is best known as a painter of subjects of everyday life representing 18th-century England. His pictures treating of classic Greek and Roman subjects are also notable. Millet was actively identified with the organization of the American Academy at Rome and was a member of the National Academy of Design. He lost his life in the *Titanic* disaster of 1912. His chief paintings include *At the Inn, A Cosy Corner, Between Two Fires,* a decoration in the Minnesota State Capitol, and portraits of his wife and President Butler of Columbia University.

**Millet,** *Me" leh',* **Jean François** (1814-1875), a celebrated French painter, born in the hamlet of Gruchy into a poor peasant family. After dire struggles with poverty, he was enabled to study at the School of Fine Arts, Paris; but the rigid, classical style which prevailed there was distasteful to him, and he retired to Gruchy. His *Milkwoman* and *Lesson in Riding* were exhibited at the Salon in 1844. Subsequent exhibitions excited adverse criticism; but in 1848, relieved from immediate want by the sale of his *Winnower* and further assistance, he was enabled to leave Paris, to which city he had recently returned, and settle at Barbizon. Here, in company with Rousseau, he labored the remainder of his life, and here his best work was done. Among Millet's greatest canvases are *The Potato Planters, The Gleaners* and *The Angelus.*

**Millipede,** *Mil' li peed,* or **Thousand-Legged Worm,** a family of harmless but generally disliked animals of the group known as Ceratophora, which also includes the centipedes. The millipede has a long, cylindrical body having a horny covering and divided into numerous segments. Each segment has two pairs of legs which are set very close together. The number of the segments and the consequent number of legs have given it its popular name, although there are far from 1000 legs. The millipede moves slowly in spite of its numerous legs, and feeds only upon vegetable matter. It has not, as was once supposed, dangerous poison fangs. See CENTIPEDE.

**Mill Springs, Battle of,** an engagement of the Civil War, fought Jan. 19, 1862, at Mill Springs, on the Tennessee River, in Kentucky, between 4000 Federals under General Thomas, and an equal number of Confederates under Gen. George B. Crittenden. The Federals opened the battle, which lasted all day, and by nightfall the Confederates were defeated and retreating toward Nashville. A National cemetery marks the battlefield of Mill Springs, or of Fishing Creek, as it was also called.

**Millville, N. J.,** a city of Cumberland Co., 40 m. s.e. of Philadelphia, on the Maurice River, at the head of deep-water navigation, and on the Pennsylvania Railroad. The town has a large public park at Union Lake, a small but attractive sheet of water. Millville is an important manufacturing center and has extensive iron foundries, glass factories, shirt-waist factories, cotton mills and bleach and dye works. It is also a shipping center for fish and produce. The town was incorporated in 1801 and chartered as a city in 1886. Population in 1910, 12,451.

**Mil'ner, Alfred Milner,** VISCOUNT (1854- ), an English statesman, born at Bonn, Germany. After completing his education he engaged in journalism. His public career began with his service as private secretary to

the chancellor of the exchequer (1887-89). This was followed by his appointment as undersecretary of finance in Egypt. In 1897 he became high commissioner of South Africa and governor of the Cape of Good Hope, and in 1901, governor of the Transvaal and Orange River colonies. He returned to England in 1905, and in later years advocated tariff reform and colonial preference. Lord Milner was subjected to severe criticism in Liberal circles as being partly responsible for the Boer War, but was honored by others as having laid the foundation upon which "a united South Africa would arise to become one of the states of the empire."

**Miltiades,** *Mil ti' a deez,* a famous general of Athens, born in the latter part of the sixth century B. C. He became the ruler of the Chersonesus and led a successful expedition against the Scythians. When the Persians invaded Greece in 490 B. C. he commanded the Athenian force, and by his masterly strategy won the Battle of Marathon. The next year he led a fleet of 70 ships in an unsuccessful expedition against Paros, where he was wounded. On his return he was overthrown by the Democracy and condemned to pay a heavy fine. See MARATHON, BATTLE OF.

**Mil'ton, John** (1608-1674), one of the greatest of English poets, born in London. His life covers the period of the Puritan movement of the 17th century, by which he was strongly influenced and of which he was probably the best single representative. Indeed this movement in its three stages determined the main outlines of his life and the phases of his literary activity. His father was a notary public of some means who had been converted to Puritanism, but of the earlier and freer type, before its narrowness had developed. The son grew up in an atmosphere of music, literature and the social graces, mingled with sincere piety. Entering Cambridge at the age of 17, he remained for seven years, taking his master's degree in 1632. Here he wrote much Latin verse and the magnificent ode *On the Morning of Christ's Nativity.*

Retiring after graduation to his father's home at Groton, he spent six years more in the study of the classics, poetry and music, as well as mathematics, French and Italian. He had early decided to be a poet, and these days of quiet study, meditation and joyous communion with nature formed no small part of his preparation. Sweet and chivalric Spenser was his favorite poet, and all the early fruitage of the Renaissance his rich inheritance. In this idyllic atmosphere he wrote *L'Allegro, Il Penseroso, Comus* and *Lycidas,* among the greatest lyrics in the English language, characterized by a purity, grace and artistic finish that were the natural expression of Milton's fresh and beauty-loving soul.

In 1638, after the death of his mother, Milton spent two years in travel and study on the Continent, where he met many prominent men, among them Grotius and Galileo. The Civil War called him home in 1639. Puritanism had now entered its period of armed conflict for reform. For nearly 20 years Milton threw himself into the struggle for justice and freedom with unstinted devotion, using the pen as effectively as others were wielding the sword. It is the period of his controversial prose writings, with almost no poetical production. His pamphlets on divorce, due probably to his own unhappy marriage, were followed by the *Areopagitica,* a noble plea for liberty of thought and speech. Upon the execution of the King he was the first writer to come to the defense of Parliament in the pamphlet *On the Tenure of Kings and Magistrates.* It was probably this that led to his appointment as Latin secretary of the Commonwealth, in which office for the next ten years he conducted the correspondence with foreign powers and answered the pamphlets written against the government. In the midst of these duties he became totally blind; but continued his work, with Andrew Marvell as his assistant, until 1659. On the return of Charles II in 1660, Milton's books were burned by the public hangman and he narrowly escaped paying with his life

for his devotion to the cause of the Commonwealth.

Milton now returned to his long cherished purpose of undertaking a poetical production that should have a permanent place in literature. As early as 1642 he had chosen for his subject the fall of Adam. During the succeeding 16 years of strenuous conflict this theme was revolving in his mind and taking shape, until it developed into the vast drama of creation, with the entire universe as a stage, presented in *Paradise Lost.* His preparation for his task was at last complete. In his own life he personifies the disappointed hopes of Puritanism. Mingled with his disappointment, however, there is the deep conviction that the spirit of Puritanism will finally triumph. This situation, while it robs Milton's style of the airy grace and charm of his early poetry, has developed the lofty grandeur and sublimity of style best fitted for the subject matter of his great epic. The effect is enhanced by his choice of blank verse, the most severe of English measures; and by his long and involved sentences which hold the meaning in suspense until "it falls upon the mind like the combing mass of a breaker on the shore." For daring imagination, vastness of conception, wealth of illustration, sustained grandeur of thought and sublimity of expression, *Paradise Lost* is probably without an equal in any language.

*Paradise Lost* was finished in 1665 and published in 1667. Four years later appeared a volume containing *Paradise Regained,* whose subject matter is indicated by its title, and *Samson Agonistes.* The latter was a new venture for Milton in the field of poetry, and shows his genius at its maturest. The subject, moreover, was one which his own experience, private and public, fitted him to develop. It has been called the most successful tragedy of the Greek type ever written by an English poet. Milton's many-sided and strenuous life came to an end three years after the publication of his last volume of poems, and he was buried in St. Giles's, Cripplegate, beside his father. His writings, and especially *Paradise Lost,* his great masterpiece, have won for him a foremost place in English literature, second only to that of Shakespeare; while the moral beauty of his character and the patriotic and tragic devotion of his life command universal admiration and respect for him as a man. See CROMWELL, OLIVER.

**Milwaukee, Wis.,** the metropolis of the state, is located on Lake Michigan, 85 m. n. of Chicago, at the confluence of three rivers which flow into a bay vying in beauty with the famous Bay of Naples. The outer harbor, with its 2 m. of breakwater, constitutes a fine harbor of refuge. The inner harbor has 30 m. of dockage and is considered the best on the lakes. The largest lake steamers can unload their cargoes in the very heart of the city. The rivers, which divide the city into three parts, are spanned by numerous bascule bridges and viaducts.

PARKS AND BOULEVARDS. Over 1000 acres are devoted to park purposes. Lake, Juneau and Riverside parks are on the East Side; Kosciusko, Mitchell and Humboldt parks on the South Side; and Sherman, Highland and Washington parks on the West Side. Of these, Lake Park, with its numerous ravines, tributary to Lake Michigan, is the most beautiful. Washington Park contains a large zoological garden, and Mitchell Park is celebrated for its conservatory, containing a large collection of rare plants and flowers. Juneau Park was so named in honor of Solomon Juneau, the founder of the city. Grand Avenue, Prospect Avenue and Lake Drive are some of the most beautiful residence streets in the world.

PUBLIC BUILDINGS. The principal public buildings are the Federal Building, containing the post office, headquarters for the United States courts in Wisconsin, the custom-house and the weather bureau; the Milwaukee Public Library and Museum, containing 231,096 volumes and 325,257 specimens of every description; and the Layton Art Gallery, containing one of the best col-

lections of paintings in the United States. The Auditorium, with a seating capacity of 8000 in its main hall and 4000 in the smaller halls, is a semipublic building, having been erected partly by private subscription and partly by public taxation. There are many modern business structures, over 100 hotels and 189 churches in the city. Milwaukee is the seat of a Roman Catholic bishop and a Protestant Episcopal bishop. Milwaukee is essentially a city of homes, the percentage of laboring people owning their homes exceeding that of any other large city in the Union. Its street-railway system is unsurpassed. Interurban lines connect the city with Port Washington and Sheboygan on the north, Waukesha, Oconomowoc and Watertown on the west, and Racine, Kenosha and Chicago on the south.

Educational Institutions. There are 57 public elementary schools in which, in addition to the regular subjects, German, Polish, and Italian are offered; and five large high schools. Among the special features of the school system are social and recreational centers, medical and dental inspection, vocational evening classes, ungraded classes, the period set aside each day for special help, open-air schools, and classes for exceptional children, for stammerers and for the blind and the deaf. The last named, upon completing the course in the elementary schools, enter the high schools and work side by side with the seeing and hearing children. There is also a large, well-equipped school of trades for boys and girls, the first school of its kind to be opened in the United States. There are 61 parochial and 17 nonsectarian private schools. The children of the private and parochial schools receive instruction in manual training and domestic economy in the public schools.

Among the higher institutions of learning may be mentioned Marquette University (Catholic), including among other departments medical, dental and law schools; Concordia College (Lutheran); Milwaukee-Downer College (for girls); the Milwaukee State Normal School; the National German-American Teachers' Seminary; the Wisconsin College of Physicians and Surgeons; the Wisconsin Academy of Music; and seven commercial colleges.

Population and Health. Milwaukee covers an area of 24 sq. m. and has a population of over 400,000. Surrounding the city are many suburbs, which are practically a part of the city. About half of the people are of German descent. The proportion of illiterates is very small and the percentage of crime and vice is very low. Milwaukee is a healthful city, its annual death rate being only 12 per 1000. Its climate is tempered by Lake Michigan. Its excellent sewerage system extends to all parts of the city. The drinking water is drawn from Lake Michigan. The water-supply system, representing an investment of over $5,000,000, is owned and operated by the city. There are two flushing tunnels connecting the rivers with Lake Michigan, by means of which the rivers are flushed with fresh water once every day.

Industries and Commerce. The manufacturing districts are found on the river "flats" and along the belt lines of the railroads extending around the city. The principal business sections are in the valleys above the "flats." Having both rail and water transportation facilities, Milwaukee has become one of the largest collecting and distributing centers in the United States for coal and grain, and for flour, lumber and many other manufacturing products. Shipments are made by means of the Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Soo, the Grand Trunk and the Pere Marquette railways, and some 15 lines of lake steamers. The Pere Marquette Railway connects with its main line at Ludington, Mich., and the Grand Trunk with its main line at Grand Haven, Mich., by means of railway ferries and break-bulk boats. The favorable commercial location of the city, the cheap coal rates, the short distance from iron mines, lumber regions, the grain fields of the Northwest, and many

other raw materials, and the skillful, industrious labor constituency,—all combine in making Milwaukee one of the largest manufacturing centers in the United States. It has the largest tanneries, the largest breweries, and the largest machinery-construction shop in the world. The leading manufactured products are as follows: leather and leather products, iron and steel goods and heavy machinery, beer and malt, packed meats, coal products, building material, agricultural implements, distilled and rectified liquors, and electric and telephone supplies. Besides these, there are 39 other industries, each of which has an output valued at from $1,000,000 to $5,000,000, and 43 industries whose output is valued at from $100,000 to $900,000. Milwaukee products are shipped to all parts of the world. The total value of all the manufactured products for 1911 was $355,320,396, and the wholesale jobbing trade amounted to $446,768,361.

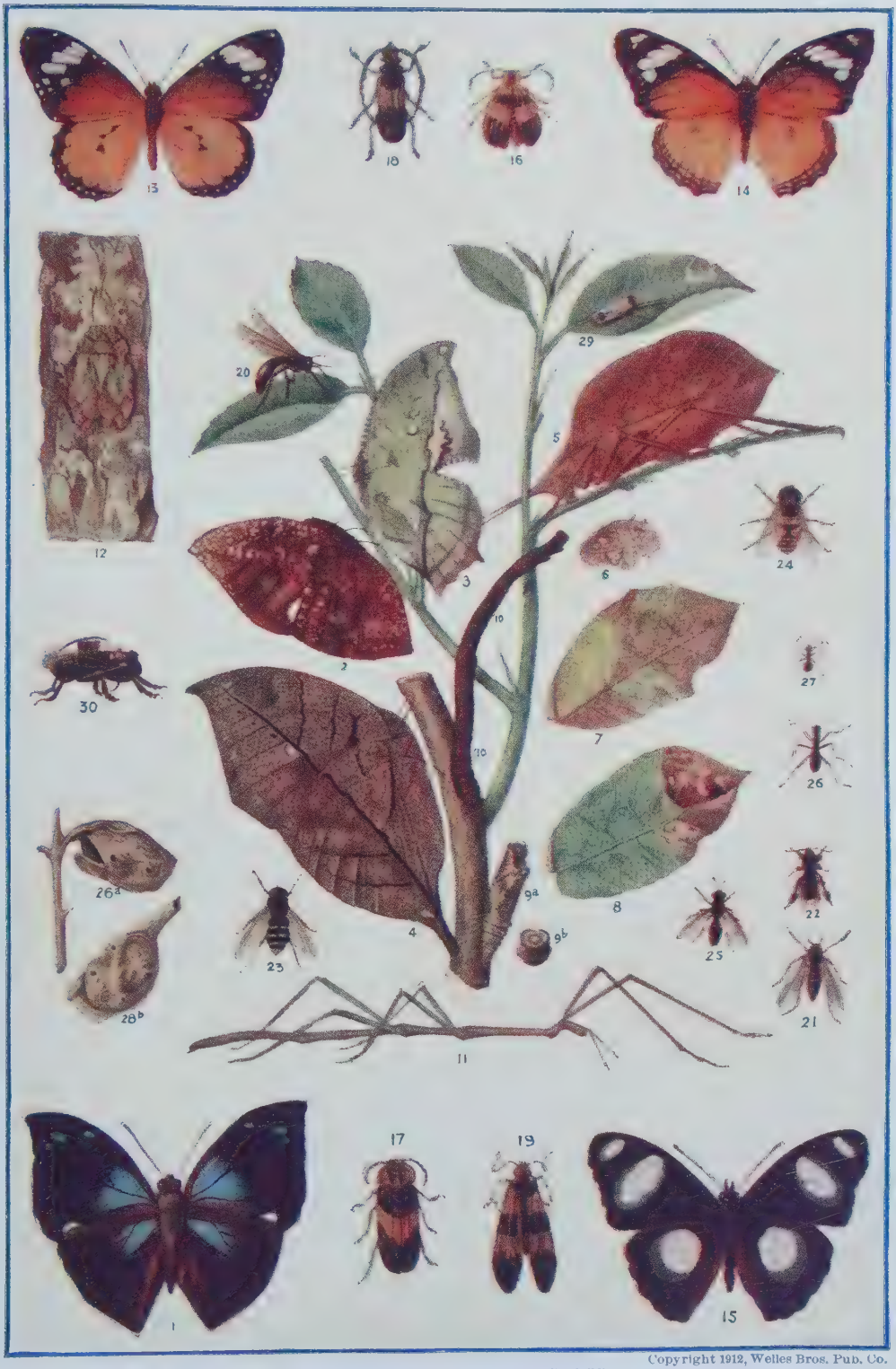
History. It is supposed that Joliet and Marquette were the first white men to enter the bay in 1673. For the next century the site was frequently visited by French fur traders and by missionaries. In 1763 a fur-trading post was established. In 1795 Jacques Vieau, in the employ of the North-Western Fur Company, established a permanent post here. In 1818 Laurent Juneau began a settlement and is generally considered the founder of the city. Settlements were made on both sides of the river and were known as Milwaukee East Side and Milwaukee West Side. A third settlement on the south side was known as Walker's Point. In 1846 these three villages were united as the city of Milwaukee, of which Juneau was the first mayor. Immigration from Germany began in 1840 and added much to the city's population. The first newspaper was published in 1836, and the first bank was established in 1837. The city was connected to Chicago by telegraph in 1849 and by railway in 1856. Milwaukee's growth has been constant and substantial and the city forms one of the most important ports on the Great Lakes. Population in 1910, 373,857.

**Mimeograph,** *Mim′ e o graf″*. See Copying Devices.

**Mimicry,** *Mim′ ik ry,* a superficial resemblance, always external and plainly visible, of one animal to another or to some inanimate object. Such imitation is now considered under two classes. The first, cryptic mimicry, or likeness to the object upon which the imitator usually rests, is frequently spoken of as protective resemblance. It is noticeable in almost all forms of animal life, and is undoubtedly the commonest means of

MIMICRY

protection. The tree toad, which, with its gray, spotted body, resembles the bark of the tree upon which it waits for its prey, changes its color in an hour's time, as the sun mounts higher in the sky and brightens the color of the bark. The green katydid can barely be distinguished from the stalk of grass to which it clings. Members of the Walkingstick Family are so much like twigs, both in form and color, that, though they are fairly common insects, they are rarely noticed. Caterpillars are commonly so colored and shaped as to be rendered inconspicuous, and butterflies are frequently shaded like the flowers which they most affect. The leaf insect in

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PROTECTIVE MIMICRY—INSECTS

1. Butterfly becoming (2) when at rest. 3, 4, 5. Other leaf imitators. 6, 7, 8. Wings completely hiding insects. 9. Pupa-case resembling broken twig. 10. Caterpillar apparently a dead branch. 11. Walking-stick. 12. Bark bug. 13. Female of agreeable tasting butterfly mimicking (14) a nauseous species while male (15) remains unchanged. 16, 17, 18. Beetles imitated by (19) a butterfly. 20, 21. Butterflies resembling ichneumon fly and wasp. 22. Bee-like beetle 23, 24, 25. Harmless flies protected by likeness to stinging bees and wasps. 26, 27. Imitators of ants. 28. a. Wasp's nest mimicked by (b) cocoon.

shape and color is much like a living leaf. In the insect world examples of protective coloring might easily be multiplied, and it is interesting to discover how many come under one's observation in the course of a short walk through the woods. Among the higher animals, the zebra, whose striped body imitates the sunlight and shadow through the trees, is a well-known example. In the illustration the left-hand figure shows a measuring worm posing as a twig, and the right-hand figure, a walkingstick which closely resembles the branch upon which it rests.

True, or aposematic, mimicry is ordinarily implied in the use of the word *mimicry*. It refers to the wholly external, and never structural, resemblance of an otherwise helpless animal to another which is in some way well armed. A familiar example is found in the robber fly, whose big body and hairy legs so resemble the bumblebee that only close observation will distinguish between them; thus the stingless fly is rendered safe from attack by birds and other animals which have learned that the bee is not defenseless. Other flies resemble wasps. A very curious case of mimicry is that of the monarch butterfly, which bears a pair of unpleasant scent glands extremely offensive to birds. Numerous species of butterflies, notably the viceroy, have adopted a like coloration and so are free from attack.

In every case of mimicry, which has been the subject of especial study, two facts have been found true: the imitator and the imitated inhabit the same general region, and the imitator is, except for its mimicry, almost entirely defenseless. It is generally true also that the female, which is ordinarily less able to escape than the male, is the more accurate in its mimicry. Both protective resemblance and mimicry are supposed to be the result of natural selection. Darwin in his *Origin of Species* discusses these subjects at length, and J. L. Hancock in *Nature Sketches in Temperate America* gives a less technical and very entertaining review of the subject.



**Mi'nas Bay,** or **Basin of Minas,** the eastern arm of the Bay of Fundy, extending into Nova Scotia for 60 m. The Avon is the chief river falling into it, and on the shores of the bay is the village of Grand Pré, the scene of a part of the story of Longfellow's *Evangeline*.

**Mind,** as defined by modern psychology, "the sum total of an individual's mental experience." Mind is considered to include one's entire mental powers, as sensation, perception, memory, imagination, thought, reason, feelings and will. These different mental powers are no longer considered as distinct faculties but as modes of mental activity. When the term *mind* is used in distinction with body it means the spiritual entity of man. Psychologists consider the terms *mind* and *soul* to be synonymous. When the term *soul* is used in a religious sense, however, its meaning is usually restricted to those spiritual activities arising from one's relation to a supernatural being.

**Mindo'ro, Sea of.** See SULU SEA.

**Min"eral'ogy,** the science of minerals. Mineralogy differs from geology in that it considers each mineral separately and studies its physical and chemical properties. It also considers the origin of the various minerals and their relation to each other. A knowledge of mineralogy is necessary to the geologist in his study of rocks, to the mining engineer in locating metal-bearing rocks and to the metallurgist in extracting metals from their ores (See METALLURGY.)

Many minerals are highly useful in the arts and others are highly prized as gems (See PRECIOUS STONES). A few minerals, notably quartz, feldspar, mica, hornblende, calcite and clay, enter into the composition of many rocks and constitute by far the larger part of the earth's crust. The study of mineralogy enables one to distinguish common minerals at sight, and when this knowledge is gained, one can easily learn to recognize such rocks as granite, marble, porphyry and basalt.

By structure, minerals are classified as

crystalline and massive. Quartz and calcite are excellent examples of crystalline minerals, and clay is a good example of the massive varieties. Two important tests in classifying minerals are crystallization and hardness. The same substance always crystallizes on the same plan (See CRYSTALLOGRAPHY); hence the study of the crystals to determine the plan on which they are formed is very important. The degrees of hardness are

MINERVA

determined by tests and range from one to ten. Beginning with the softest they are as follows: 1, talc, 2, selenite, 3, calcite, 4, fluorite, 5, opalite, 6, feldspar, 7, quartz, 8, topaz, 9, corundum, 10, diamond. Consult J. D. Dana, *System of Mineralogy;* E. S. Dana, *Minerals and How to Study Them.*



**Mineral Wool,** a material resembling wool in appearance, and produced when molten slag from a blast furnace is subjected to a jet of steam or air under pressure. It is used as a nonconductor of heat for covering boilers and steam pipes. See BLAST FURNACE; SLAG.

**Miner'va** (in Greek, Athene), in classical myths, goddess of skill and wisdom, of all the liberal arts and sciences, useful and ornamental, for both men and women, was the daughter of Jupiter and Metis. A short time before her birth her father swallowed her mother; thus it happened that she sprang from her father's brain full-grown and dressed in armor. As patroness of arts and industries, Minerva superintended the construction of the wooden horse and of the Argo. As an expert weaver she not only made robes for herself, Juno and many divinities and heroes, but instructed favored mortals. Being an advocate of scientific and defensive warfare, a direct contrast to Mars, she protected cautious warriors. Of these, Ulysses was her favorite. Minerva is said to have invented the flute and to have thrown it aside in disgust because Cupid laughed at her puffed cheeks as she was playing. In a contest as to who could produce the most valuable gift for man, Minerva, on furnishing the olive, was awarded the prize, which was the city called Athens in her honor. Here the gorgeous Panathenæa was celebrated for her.

The olive was Minerva's choice plant; the serpent and owl were her favorite pets. Often she was represented in gilt helmet, carrying her shield, in the center of which was the Gorgon's head. She appeared, too, in the peaceful garb of a Grecian matron.

**Min'ing**, the process by which commercial minerals are taken from their natural position in the earth and made available for shipment. All useful metals and their ores and many nonmetallic substances, such as coal, building stone, natural fertilizers and salt ore, are obtained by mining. However, other terms may be used in describing the various processes of separating these substances from

their natural position. The term *mining* is generally employed to denote the means by which the substances like ores are obtained from the earth, while those processes which have to do with separating the metals from their ores are included in the art of metallurgy. See METALLURGY.

Mining has been practiced for thousands of years. It is referred to in the 28th chapter of *Job,* and the working of a gold mine is described and illustrated in an Egyptian papyrus drawn in 1400 B.C., and now preserved in the museum at Turin. Minerals procured by mining may be divided according to their formation into three classes: those occurring in the form of beds or layers beneath the surface; those occurring in veins or seams in rocks; and those found upon the surface of the earth. Deposits in beds usually include such bodies of useful materials as iron and coal, which often lie in beds generally parallel to layers of rock and copper deposits which are scattered through stratified rocks, as in the beds of copper ore in the Lake Superior region. Veins or seams are fillings of cracks or fissures in the rock, and are often known as "lodes" if the mineral is valuable (See VEINS). Veins differ from bedded deposits in being less continuous, more irregular and without any relation to the form of the rock. Vein deposits, as well as those in beds, may be horizontal, vertical or inclined to various angles. Surface deposits generally consist of gravel, sand or earthy matter containing some valuable mineral like gold, as those in Alaska and other places in the Rocky Mountains. Tin ore is found also in gravel and sand.

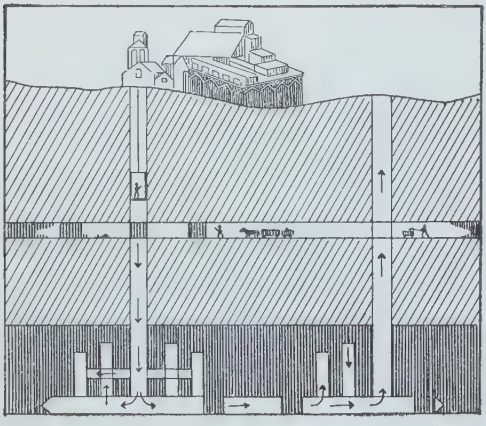
EXPLORATION. Before a mine is opened it is usually explored or tested to determine the extent and value of the deposits. The methods employed depend largely upon the conditions confronting the operators. If the ore is near the surface, shallow pits may be dug at various places, or the overlying rock and soil may be stripped off a considerable area. The modern method, however, for exploring deep deposits is by boring, using apparatus similar to that employed in boring wells, except that a diamond drill takes the place of the ordinary drill; the core formed by the drill gives an exact representation of the depth and character of the deposit. See WELL BORING.

METHODS. Mining may be divided into two classes: (a) surface mining, or "openwork," and (b) underground mining. In openwork mining may be included gold placer mining in which the ore is separated from the sand and gravel by causing water to flow in a continuous stream over the gravel and sand. The lighter materials are washed away, leaving the gold behind. Openwork of another character is employed in mining iron in the Mesaba Range in Minnesota, where the ore is covered only by a sort of rotten stone which may often be stripped off by steam shovels. This ore is soft and friable, and easily handled by steam shovels (See IRON AND STEEL), but when it is hard it is blasted by dynamite and taken out in masses. In underground mining the cheapest, best and easiest method is by tunnels, provided the ore body lies in the side of a mountain or hill, for if the ore can be conveyed horizontally out of a tunnel, it is cheaper than hoisting the material through a shaft. By having a tunnel on a slight incline, the drainage is improved, and by this means sometimes the expense of pumping out the water is saved. When it is necessary to approach the ore by a shaft, it may be vertical or inclined, as is best suited to the conditions. In small mines this shaft may be only four feet square, but it should be sufficiently large to permit the working of at least two hoists, with cages or skips. There should also be room for pipes and means for ventilation, and carrying down water, etc.

When the material lies in a horizontal bed, like coal, the shaft is sunk to a point a little below it, and levels or crosscuts in the form of tunnels or galleries are made, leading from the shaft into the material to be mined. As the material is worked, it is hauled to the shaft, and by means of a hoisting engine the skip or cage is hoisted up to the surface. The

shaft in the Calumet and Hecla copper mine, Calumet, Mich., exceeds 5000 ft. in depth. Before the introduction of the rock drill (See PNEUMATIC TOOLS) and blasting, mining was a slow operation, particularly when mining through hard rock, like quartz, in which gold is found. The miners in ancient times used wedges of dry wood, which after being inserted in the crevices of the rocks were wetted, which made them swell and force the rock asunder.

COAL MINING. As coal is easily mined, various methods are employed. Drills operated by compressed air or steam may be used to drill small holes, which are filled with gunpowder. This explosive, set off by an electrical current, removes



COAL MINE

large masses from their natural position. Various cutting machines are used, operated either by compressed air or electricity. One form consists of an endless chain on which are placed cutting knives that are made to travel around a frame, and when brought in contact with the coal, cut a groove into it, generally at the bottom, making an undercut. As the coal is removed by further cutting or blasting, the roof of the mine is supported either by leaving pillars of coal at frequent and measured intervals or by the use of suitable timbers. In a mine free from obstructions, the arrangement of levels, crosscuts and galleries is like the streets and alleyways of a city. In deep mines the shaft usually passes through several layers or levels of coal, each of which communicates with the shaft by means of doors.

Coal mines need to be carefully arranged, so that they may be thoroughly ventilated, because of the formation of dangerous explosive gases (See FIRE DAMP). In shallow mines the ventilation may be made by means of an air shaft heated below, but in mines of any great depth, large fans, driven either by steam or electricity, are employed. These may be located at the foot of the shaft and exhaust the air and blow it out of the mine, or may be located on the surface and blow a sufficient amount of fresh air down into the mine. See HEATING AND VENTILATION.

**Min'ister - Plen"ipoten'tiary.** See DIPLO'MACY.

**Mink,** a lively little fur-bearing animal of the Weasel Family, equally at home upon land or in the water. It is small, with a slender body, webbed feet and a tail about one-third the length of the body. It may be found in almost any part of the United States and is often seen dodging in and out along the banks of small streams looking for frogs and lizards, or scampering across fields where field mice and other Rodents abound. The mink is easily trapped and the pelt is a source of income to many a farmer's lad. The fur of the Northern species alone is particularly valuable, and then only when secured early in the winter before the coat has been torn by jagged rocks or dense barrier thickets.

**Min"neap'olis, Minn.,** the largest city of the state and the county seat of Hennepin Co., is situated on both banks of the Mississippi River, 420 m. n.w. of Chicago and 581 m. n. of St. Louis, and on the Great Northern, the Northern Pacific, the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Burlington, the Minneapolis, St. Paul & Sault Ste. Marie, the Minneapolis & St. Louis and other railroads. There are three passenger stations within the city limits—the Union Depot and the stations

of the Chicago, Milwaukee & St. Paul and of the Minneapolis & St. Louis railroads. The city occupies an approximately level site, with ranges of low hills on the northeast and the southwest. The Mississippi divides the city into two unequal parts, known respectively as the Eastern Division and the Western Division, the latter being much the larger. St. Anthony's Falls, in the heart of the city, once formed a beautiful cascade, but the construction of a dam across the river at this point has greatly changed their appearance. Below the falls the river flows through a deep gorge, which adds to the beauty of the scenery. Within the city limits the Mississippi is spanned by 20 bridges about equally divided between railways and highways.

Streets. The city is regularly laid out, and most of the streets cross at right angles. The streets are broad and in the residential sections are ornamented with shade trees. The streets running east and west are designated as avenues and those running north and south as streets. The river is the dividing line for streets running north and south, and in the Western Division, Hennepin Avenue as far as Kenwood Boulevard is the dividing line for streets running east and west; and in the Eastern Division, Central Avenue and Division Street form the dividing line. Both streets and avenues are numbered consecutively from the street forming the dividing line. The avenues north of this line are designated as *north* and those south of it as *south*. The building numbers are on the plan of 100 to the block, so that each block begins with another hundred, regardless of the last number in the preceding block. By this system any point in the city is readily found.

Hennepin and Nicollet avenues and First and Second avenues south are the principal streets of the retail district. The wholesale and manufacturing districts extend along both banks of the river from Riverside Park northward to the city limits. An excellent street-railway system, including all the lines of Minneapolis and St. Paul, reaches all parts of the city and has four interurban lines to St. Paul.

Parks and Boulevards. Minneapolis has an elaborate system of beautiful parks and parkways embracing an area of about 3600 acres, with connecting parkways and drives about 40 m. in length. The system begins with Loring Park, a beautiful tract near the center of population, whence it extends through a parkway to a chain of lakes in the southwestern part of the city. These lakes include Cedar Lake, Lake of the Isles, Lake Calhoun and Lake Harriet, each a gem of clear water with a beautiful setting. The parkway extends around three of these lakes, following the shore line. From Lake Harriet it follows Minnehaha Creek to Minnehaha Falls, a beautiful cascade about 50 ft. high and made famous by Longfellow's *Hiawatha*. Minnehaha Park has an area of 142 acres and on the south joins the grounds of the Minnesota State Soldiers' Home. A parkway extends along the bluff of the Mississippi from Minnehaha to Riverside Park. On the opposite side of the river a boulevard leads to the beautiful campus of the University of Minnesota. A short distance below the soldiers' home is Ft. Snelling, a United States military reservation. There are a number of parks not yet connected with the boulevard system, chief among which are Glenwood and Powderhorn in the Western Division and Columbia in the Eastern Division.

Buildings. The most important public building is the courthouse and city hall, a granite structure occupying an entire block and erected at a cost of over $3,000,000. The building was erected conjointly by the city and county. The Auditorium on Nicollet Avenue and Eleventh Street, with a seating capacity of 2500, is one of the most excellent and beautiful buildings of its kind in the country. Among other buildings of note are the National Guard Armory and Coliseum, Masonic Temple, the Chamber of Commerce, the Lumber Exchange, the Metropolitan Life Building, the New

York Life, the Edison, the Corn Exchange, the Security Bank, the Minneapolis Public Library and the Federal Building in the Western Division, and the buildings of the University of Minnesota in the Eastern Division.

The leading hotels are the Radisson, the West, the Nicollet, the Dyckman, the Rogers, the Vendome and the Leamington, the largest family hotel in the country. The leading theaters include the Auditorium, the Metropolitan Opera House, the Bijou, the Orpheum, the Princess and the Shubert. Among the leading churches are the Roman Catholic Pro-Cathedral, the Church of the Redeemer, the Wesley and the Fowler Methodist Episcopal, the Westminster Presbyterian, the Plymouth Congregational, the First Unitarian and the First Baptist.

Industries and Commerce. The abundant water power furnished by St. Anthony's Falls and the nearness of raw material make Minneapolis an important center for the manufacture of lumber and flour. It is the largest flour-manufacturing center in the world, and its great mills, located along the river in the heart of the city, have a combined capacity of 90,000 barrels a day. The flour from these mills has obtained a world-wide reputation for its superior quality, and the extent of the industry has very appropriately given Minneapolis the popular name of the "Flour City."

The manufacture of lumber is the next important industry, and Minneapolis is one of the largest lumber-producing centers of the country. The logs are taken from the forests in the northern part of the state and floated down the Mississippi to the mills. The most modern machinery and labor-saving devices are in use in the mills, which are among the largest in the United States. The manufacture of lumber products, such as doors, sash, interior finishings and furniture, is also extensive. There are also large cooperage works, for whose product the flour mills furnish a constant demand. Other industries include the manufacture of underwear and other knit goods, the production of linseed oil and malt liquors, the manufacture of machinery and structural ironwork and the manufacture and repairing of railway cars.

The city is the second center for wholesale trade in agricultural implements and is the largest primary wheat market in the world. An extensive jobbing trade in other commodities is also carried on. Minneapolis and St. Paul constitute the great railway and distributing center for the Northwest, the cities forming the connecting point between the trunk lines from the south and east and those extending to the Pacific coast through Minnesota and the Dakotas and to the Canadian Northwest. Railway facilities for both passengers and freight are of the best. Improvement of the Mississippi to the heart of Minneapolis gives the city a direct water route to the Gulf of Mexico.

Institutions. Minneapolis maintains an excellent system of public schools, with about 75 school buildings and over 40,000 pupils. The leading educational institution is the University of Minnesota, occupying a beautiful site on the east bank of the Mississippi (See Minnesota, University of). Other higher institutions of learning are Hamline University (Methodist Episcopal) at Hamline, Minnesota College (Swedish), Augsburg Seminary (Lutheran), the Minneapolis School of Music, the Northwestern Conservatory of Music, and two normal schools for training kindergarten teachers. The leading hospitals include the Minneapolis City Hospital, the Minnesota State Hospital for crippled and deformed children, the Asbury Methodist, the Northwestern, St. Mary's and St. Barnabas. Among the charitable institutions are the Catholic Orphan Asylum, the Washburn Bethany Home, the Pillsbury House and several free dispensaries.

History. Father Louis Hennepin, a Jesuit missionary, discovered and named the Falls of St. Anthony in 1680. In 1805 a military reservation was established here. In 1838 the territory on

the east bank of the river was thrown open to settlement, and the village of St. Anthony was founded. Ten years later the first sawmill was erected. In 1849 a settlement was begun on the west side of the river, and in a few years this settlement was larger than St. Anthony. It was named Minneapolis, a compound of a Dakota word *minnie,* meaning water, and the Greek *polis,* meaning city. Flour mills were established, and after 1855 the city grew rapidly. The city's development has been coincident with that of the great states to the west, and has been constant and substantial. Population in 1910, 301,408.

**Min'nesing"er** (from the old German word *minne,* meaning love), the name applied to the German lyric poets of the 12th and 13th centuries, whose chief theme was love. They usually sang their own compositions, accompanying themselves on the harp. Their poetry was mainly chivalric in character, as they flourished when the age of chivalry was at the height of its splendor. The birthplace of German lyric poetry was Upper Austria, but, as the minnesingers carried their sweet music from castle to castle, they wandered far from their native home, even beyond the German border. The names of nearly 200 minnesingers have come down to us, but very few of their songs have been preserved. See MASTERSINGER.

**Minnesota,** *Min" e so' ta,* THE GOPHER STATE, also *The North Star State,* one of the West North Central States, is bounded on the n. by Canada, on the e. by Lake Superior and Wisconsin, on the s. by Iowa and on the w. by South Dakota and North Dakota. The eastern boundary is formed largely by the St. Croix and Mississippi rivers. The western boundary is formed partly by the Red River of the North, and the greater part of the northern boundary by a chain of lakes and the Rainy River. Owing to a geographical error in the Treaty of Paris in 1783, there is a slight projection northward on the west side of the Lake of the Woods.

SIZE. The extent from north to south is 380 m. The greatest breadth, near the northern boundary, is 346 m., and the area is 84,682 sq. m., of which 3824 sq. m. are water. Minnesota is a little smaller than Idaho or Kansas, larger than Kentucky and Tennessee combined, about two-thirds the size of the United Kingdom and the 11th state in area.

POPULATION. In 1910 the population was 2,075,708. From 1900 to 1910 there was a gain in population of 324,314, or 18.5 per cent. There are 25.7 inhabitants to the square mile and the state's rank in population is 19.

SURFACE. Most of the state is rolling or hilly without any deep valleys or high elevations. In the northeast corner the surface slopes toward Lake Superior; the land along the lake shore is the lowest in the state, being 602 ft. above the sea. The Mesaba Range to the northwest of the lake contains the highest altitude in the state, 2230 ft. In the northwest part of the state is the great Valley of the Red River of the North, the Minnesota portion of which forms a part of the bed of the geological Lake Agassiz, an extensive tract of level land lying in Minnesota, North Dakota and Manitoba. The elevation of this plain varies from 800 ft. at the Canadian border to about 1000 ft. in its southern part, near Lake Traverse. Between these regions and southward to the Iowa boundary the surface is hilly or rolling. In the southwestern part the crests of the prairie become hills from 1600 to 1800 ft. above the sea level, and are often called by the old French name of *coteaus.* They are the "Mountains of the Prairie" referred to by Longfellow in his *Song of Hiawatha.* The southern and western parts of the state are dissected by a number of river valleys.

In the north-central part of the state is a height of land that forms the water parting of the streams belonging to three great river systems. From its slopes the streams flow into Lake Superior, thence into the St. Lawrence River, to the Mis-

sissippi and to Hudson Bay. The slopes of this water parting are so slight that they are almost imperceptible.

Rivers and Lakes. The Mississippi River rises in Lake Itasca, northwest of the central part of the state, and flows in a southeasterly direction until it reaches the Wisconsin boundary at Hastings; thence it forms the eastern boundary of the state to the Iowa line. It is by far the most important stream in the state and with its tributaries drains nearly two-thirds of the surface. Its most important tributaries from the northeast are the Rum River and the St. Croix. The most important tributary from the southwest is the Minnesota, which flows entirely across the state west to east and enters the Mississippi at Ft. Snelling, near St. Paul. The St. Louis is the principal stream flowing into Lake Superior that lies wholly within the state. The Rainy River, forming part of the northern boundary, flows into the Lake of the Woods, which outflows to Lake Winnipeg and thence into Hudson Bay. The Red River of the North rising near Lake Itasca and receiving a tributary from Lake Traverse, drains the northwestern part of the state into Lake Winnipeg, thence into Hudson Bay. Its chief tributary in Minnesota is the Red Lake River. The Des Moines drains a small section of the southwestern part, and the Zumbrota and Root rivers drain the southeastern part.

Minnesota is estimated to have over 10,000 lakes, the largest number of any state. Many of the lakes are in the celebrated Park Region in the north-central part of the state. Red Lake, having an area of 440 sq. m., is the largest body of water lying wholly within the state. Other large lakes are Leech, Cass, Winnibigoshish, Mille Lacs, and Vermilion. Rainy Lake is on the northern boundary, and only a small portion of the Lake of the Woods is in the state.

Scenery. The Park Region presents one of the most beautiful landscapes in America. It contains thousands of lakes remarkable for their clear water and beautiful forest-clad shores. These lakes are fed by sparkling streams and abound in fish. The shores of many of them are lined with cottages, the summer homes of residents of St. Paul, Minneapolis and cities of other states. Lake Minnetonka and White Bear Lake have a wide reputation as summer resorts. Near Minneapolis are the Minnehaha Falls, celebrated for their beauty and legends. In Pipestone County is a great cliff of red quartzite in front of which lies the Pipestone Quarry made famous by the legend of Hiawatha. This quarry contains the only deposits of this red pipestone known in the country. These attractions and the charming summer climate make Minnesota one of the most delightful regions for summer residence.

Climate. Minnesota has a cool temperate climate. The summers are cool and delightful, but the winters are long and severe. However, the air is clear and bracing and the low temperature is not unpleasant. Considerable snow falls throughout the state, the amount in the north exceeding that which falls in the south. The average rainfall is about 28 inches. The mean annual temperature is 46° in the southeastern part of the state, 44° for St. Paul and Minneapolis and 36° for the north.

Minerals and Mining. Almost limitless deposits of iron ore are found in the region bordering Lake Superior, and Minnesota is the first state in the production of this ore (See Iron and Steel). There are extensive granite quarries at St. Cloud and Ortonville. Limestone valuable for building purposes is quarried in Le Sueur and Blue Earth counties and near Red Wing in Goodhue County. Red quartzite, called jasper, valuable for building and ornamental purposes, occurs in large quantities in Pipestone County. Clay suitable for brick is found in many places, and slate occurs in the northern part of the state.

Forests and Lumber. In the northern half of the state there are extensive forests. The southern part of this area, known as the Big Woods, contains large quantities of hardwood timber. North

of this and extending from the Lake Superior region to the Valley of the Red River of the North are the largest forests of white pine and spruce now existing east of the Rocky Mountains. Lumbering is one of the most important industries of the state, and the annual output amounts to about $43,000,000. The industry gives employment to about 15,000 men.

AGRICULTURE. Minnesota is one of the most important agricultural states. Owing to a variety of soils and differences in climate in different sections, a large variety of crops is possible. Diversified farming is generally practiced. Improved machinery and implements are used, and the farmers resort to the most approved methods of tillage and management.

*Soil.* The soil varies in different parts of the state. In the Valley of the Red River it is a rich alluvium of great depth. In the prairie region it is generally a loam containing sand and lime and adapted to growing a great variety of crops.

*Products.* Wheat is the staple crop and in its production Minnesota ranks first. The Valley of the Red River of the North is the most valuable region in the world for raising spring wheat of high grade. This is known in the markets as No. 1 Hard. Wheat is also grown to a greater or less extent in all parts of the state. The combined output averages about 95,000,000 bushels, or one-seventh of all the wheat grown in the country. Barley is the next crop in value, and in its production Minnesota ranks second. Then following in the order of value are corn, oats, flaxseed, rye and potatoes. In the northeastern part of the state large quantities of garden vegetables are raised. In the central and southern parts the hardier varieties of apples and small fruits of all kinds are successfully cultivated. The marshes in the northern and central parts afford excellent land for raising cranberries.

Minnesota is an excellent state for raising live stock, and large numbers of horses and cattle are found on her farms. With scarcely an exception the best breeds are raised, and the excellence of the cattle and horses raised in this state has given the live stock of Minnesota more than local reputation. Dairying has become very important and it is practiced according to the most approved methods. Local creameries owned and controlled by the farmers who supply them with cream are found in all parts of the state. Large quantities of butter and cheese are made. Poultry raising is increasing and a considerable income is derived from it.

MANUFACTURES. The streams furnish abundant water power for manufactures, transportation facilities are good and raw material is produced within the state or can be imported without great expense. These conditions make Minnesota a desirable state in which to locate manufacturing enterprises. The most important industry is the manufacture of flour, in which Minnesota ranks first in the Union. The center of this industry is in Minneapolis, where are found the best flour mills in the world. Similar mills, however, are distributed over the state and their combined output is important. Second in value is the manufacture of lumber and lumber products. The great lumber centers of the state are Minneapolis, Cloquet, Brainerd, Little Falls and Stillwater. Other important industries include slaughtering and meat packing at South St. Paul, the manufacture of boots and shoes, hosiery and other knit goods, wagons and carriages, and the making of beet sugar and confectionery. Duluth has become an important center for the manufacture of iron and steel.

TRANSPORTATION AND COMMERCE. The Mississippi is navigable below St. Paul, and this stream and the St. Croix in their lower courses are used for rafting logs. A few steamers connect St. Paul with ports on the river farther south, but the bulk of the transportation is by rail. Trunk lines of railway extend across the state from east to west and north to south. These are connected by

numerous cross lines so that all parts of the state, except the northern counties which are sparsely settled, have wide access to railway transportation. The railways are controlled by the following systems: the Great Northern, the Northern Pacific, the Chicago, Milwaukee & St. Paul, the Burlington, the Soo, the Rock Island and the Chicago, St. Paul, Minneapolis & Omaha. An excellent interurban system connects St. Paul and Minneapolis and surrounding towns. Electric lines are also found in Duluth and other cities of importance. St. Paul and Minneapolis, called the Twin Cities, are the chief railway centers not only for the state but for the Northwest. Duluth, Mankato and Crookston are also centers in their respective localities.

Minnesota has an extensive commerce. Her flour is found in all states in the Union, and much wheat and flour is sent to European countries. Other agricultural produce is also marketed outside the state. Iron ore, lumber, lumber products and manufactured goods are also exported. Coal, manufactured goods and such foodstuffs as cannot be raised with profit are imported. St. Paul, Minneapolis and Duluth are the great centers of trade. Duluth is one of the important lake ports and has steamer connection with all the leading cities on the Great Lakes. It is an important point for transshipment of freight brought by steamers and transported farther west by the various railway lines.

GOVERNMENT. The constitution was adopted in 1857 and has been several times amended. The Australian ballot system was adopted in 1891. Since 1898 women have had the privilege of voting for school officers and members of library boards, and they are eligible for election to any office pertaining to the management of schools or libraries. The executive department consists of the governor, lieutenant-governor, secretary of state, treasurer and attorney-general, all elected for two years, and an auditor elected for four years. The Legislature consists of a Senate of 63 members, elected for four years, and a House of Representatives of 119 members, elected for two years. The Legislature meets biennially and the sessions are limited to 90 days.

The judicial department consists of a Supreme Court of five judges elected by the people for six years, and District Courts, the judges of which are elected for six years. There is a Probate Court in each county, and townships have courts held by justices of the peace.

EDUCATION. Minnesota maintains one of the most thoroughly organized and efficient public school systems in the Union. The schools are under the general direction of a state superintendent of public instruction who is appointed by the governor for two years. There is also a state high school board, consisting of the superintendent of public instruction, the president of the University of Minnesota and the governor. This board has general supervision of the high schools and apportions the state aid which they receive. The district is the unit for administration, but the system is so organized that not only the graded schools in cities and towns, but also the rural schools, have organic connection with high schools and through them with the state university, which is at the head of the public school system. The schools in each county are under the direction of a county superintendent. Certificates to teach are granted by a state board, on examinations which are uniform throughout the state. The high schools and graded schools are under the inspection of state inspectors. State normal schools are maintained at Winona, Mankato, St. Cloud, Moorhead and Duluth. The state university is at Minneapolis; the agricultural college and agricultural school are at St. Anthony Park. There are also a number of agricultural high schools. The leading institutions not under the control of the state are Carleton College, at Northfield; Hamline University at Hamline, in St. Paul; Macalester College, also in St. Paul; Gustavus Adolphus College, at St. Peter; and

Shattuck School, at Faribault. There are also a number of colleges and seminaries under the management of the Roman Catholic Church, the earliest founded being St. John's University, at Collegeville.

State Institutions. The hospitals for the insane are at Rochester, St. Peter, Fergus Falls, Anoka and Hastings. The schools for the deaf, blind and feeble-minded are at Faribault. The state public school for dependent children is at Owatonna. The penitentiary is at Stillwater, the state reformatory at St. Cloud and the state training school at Red Wing.

Cities. The chief cities are St. Paul, the capital; Minneapolis, the largest city; Duluth, Winona, Stillwater, Mankato, Rochester and St. Cloud.

History. Minnesota, after its river of that name, the Dakota "sky-tinted water," was visited by French fur traders as early as 1655. An important conference, in the interests of the fur trade, was held with the northern tribes of the Indians by Sieur du Lhut in 1679 near the site of the city now bearing his name. In 1680 Father Hennepin discovered the Falls of St. Anthony. In 1688 a French settlement was made on Lake Pepin. Given to Great Britain in 1763, to Spain in 1783, to France in 1800, the western two-thirds of Minnesota, lying west of the Mississippi, became part of the United States by the Louisiana Purchase, in 1803. Grand Portage, on the north side of Lake Superior, which was a village of the fur traders as early as 1767, and Ft. Snelling, built in 1820 to 1824, were the first white settlements. In 1823 the first steamboat sailed up the Mississippi into Minnesota. By the treaties of 1837, lands east of the Mississippi were ceded to the United States by the Ojibways and the Sioux. As a result, white settlers came in, and by treaties in 1851 they obtained from the Sioux the great prairie region of southern and western Minnesota, west of the Mississippi River. Having been organized a territory in 1849, Minnesota became a state in 1858. Four years later the state suffered from an Indian outbreak, when over 800 settlers were massacred by the Sioux. Since that time the state has steadily increased in population and wealth. Consult Folwell's *Minnesota,* in the American Commonwealths Series.

Governors. Henry Hastings Sibley, 1858-1860; Alexander Ramsey, 1860-1863; Henry A. Swift, 1863-1864; Stephen Miller, 1864-1866; William Rainey Marshall, 1866-1870; Horace Austin, 1870-1874; Cushman Kellogg Davis, 1874-1876; John Sargeant Pillsbury, 1876-1882; Lucius Frederick Hubbard, 1882-1887; Andrew Ryan McGill, 1887-1889; William Rush Merriam, 1889-1893; Knute Nelson, 1893-1895; David Marston Clough, 1895-1899; John Lind, 1899-1901; Samuel R. Van Sant, 1901-1905; John Albert Johnson, 1905-1909; Adolph Olson Eberhart, 1909-1915; W. S. Hammond, 1915—.

**Minnesota River,** a tributary of the Mississippi, rising in the northeastern part of South Dakota, and flowing through Big Stone Lake on the boundary between South Dakota and Minnesota, then across Minnesota, entering the Mississippi opposite St. Paul. It has a total length of 470 m. and is navigable for steamers for 45 m. Falls and rapids obstruct much of its course.

**Minnesota, University of,** at Minneapolis (1851). Established by the Territorial Legislature, a new charter was granted in 1868 and a year later collegiate work was begun. The university maintains a graduate department, colleges of literature and arts, engineering, agriculture, law, medicine, dentistry, farming and education, and a school of mines, a state agricultural experiment station and the state geological and natural history survey. The campus contains some 45 acres, and the experimental farm, about 250. Situated between the commercial centers of St. Paul and Minneapolis, all the advantages of a large city are easily available. Its library contains 150,000 volumes and there are more than 4000 students. The faculty numbers over 400.

**Minnow,** *Min' o,* a large family of fresh-water fishes, mostly of small size. Two species, the carp and the goldfish, introduced into American waters from the Old World, are of larger dimensions, but by far the greater number are small and used only as bait in catching pike, trout and pickerel. They are recognized by their rounding scales, elevated back having a single dorsal fin, their square nose and low lateral line. Few exceed three inches in length. They are very prolific, and the silver-mouthed minnow is especially common on the sandy beaches of the inland lakes. The shiner, a closely related member of the family, is a common brook fish used as bait.

**Min'otaur,** in Greek myths, a ferocious monster with a man's head and a bull's body. It fed on human flesh. King Minos of Crete kept it in the labyrinth, where, each year, a tribute of seven youths and seven maidens was delivered by Athens. Theseus killed the Minotaur. See THESEUS.

**Min'strel,** a name introduced into England by the Normans and applied to one of a class of musical entertainers of medieval times. The minstrel wandered from castle to castle, singing to the music of the harp or telling stories. Sometimes a minstrel attached himself to a lord, whom he followed in all his undertakings. The minstrels of England, especially those who composed their own songs, corresponded in a general way to the Welsh bards, the French troubadours or the Scandinavian scalds. The term *minstrel* is used today to designate one of a troupe of musical performers who give a program consisting of negro melodies, jokes and impersonations.

**Mint,** a place where money is coined, usually by public authority. In primitive times metals used as money had to be weighed for each transaction. Commerce took a long stride forward when the piece of metal was stamped to indicate authoritatively its weight and purity. This invention is usually attributed to the Lydians, who used gold and silver coins about 900 B. C. Homer, however, mentions brass money as early as 1184. The first Roman coinage was of brass, but in 269 B. C. silver coins came into use, and gold coins shortly thereafter. The most ancient coins now in existence date from the fifth century B. C. Coins have been of various shapes at different times—cubical, square, oblong, octagonal, oval, circular. Experience has shown that the circular disk suffers less from wear, and this has now been very generally adopted.

The right to coin money was early recognized as a function of government; but during feudal times, when the question of governmental authority was in much confusion, the right of coinage was exercised by feudal lords and by monasteries, so that at one time in England there was a mint in nearly every county. From the time of William the Conqueror, however, most of the coining was done in London; but all of the provincial mints were not abolished until the reign of William III. The present royal mint on Tower Hill, London, was erected in 1810-15. This furnishes the coinage for the whole British Empire except Australia and the East Indies, which are supplied from branch mints at Sydney, Melbourne, Perth, Calcutta and Bombay. Although the coining of money is a prerogative of the Crown in England, it is regulated by Parliament; and in Canada, by the Dominion Parliament.

In the United States the power to coin money and regulate its value is vested in Congress by the Constitution. The first mint was established in Philadelphia by the Coinage Act of Apr. 2, 1792, and still remains the chief mint of the United States. Other mints, however, have been established at San Francisco, New Orleans and Denver; while assaying offices are maintained in a number of other cities (See ASSAY OFFICE). In 1873 all mints and assay offices were constituted a bureau of the United States Treasury Department in charge of the director of the mint, who is appointed by the president of the United States for a term of five years,

and serves under the secretary of the treasury. When the first United States mint was established, the method of coinage was very crude, being by means of the old screw hand-press. The process was greatly improved in 1836, again 20 years later, and still again in 1870; so that now the mints of the United States are among the best in the world.

The first coin minted in the United States was the copper cent of 1793. Silver dollars were coined in 1794, and gold eagles in 1795. Coins of various denominations have been authorized at different times during the nation's history. At the present time the money minted is the standard coinage, consisting of gold double eagles, eagles, half eagles and quarter eagles, and silver dollars; the subsidiary silver coinage of half dollars, quarter dollars and dimes; and the minor coinage of nickel five-cent pieces and copper one-cent pieces. Coins struck at the other mints bear a mint mark; those at Philadelphia do not.

The mint receives all bullion or precious metals in any form, offered in quantities of $100 or more, provided the metal is not too base for economical use in coining. It is then weighed to determine its character and degree of fineness; and on the basis of the assayer's report a certificate of its net value is issued, after it has been carefully weighed and the fixed charges deducted. Payment to the depositor is made by mint checks on the United States Treasury. The price of gold is established by the director of the mint, and is $20.672 per fine ounce. Gold is coined free; but silver is purchased by the government at the market price. The metals received are then refined and reduced to ingots or bars of standard size and purity. A gold bar usually weighs 400 oz., .900 fine, and is worth about $8000. The bars are now ready for industrial purposes, or for the next step in the coining process.

Coining Process. This process is in brief as follows: The bars of gold or silver are melted and mixed with copper alloy in the ratio of 9 to 1, so as to render the melted mass .900 fine, which is the standard for gold and silver coins. This metal is then cast into ingots of the right size for the coin required. For gold double eagles, for instance, these ingots are 12⅝ inches long, 1½ inches wide and ½ inch thick, and weigh about 80 oz.; for the silver dollars, they are 12½ inches long, 1⅝ inches wide and ½ inch thick. The ingots are again carefully assayed to determine any variation from the required .900 purity. If they have no greater variation than the slight tolerance permitted by law, they are delivered to the coiner for conversion into coin.

The ingots are now subjected to the "breaking down" process by being passed rapidly between heavy rollers until greatly reduced in thickness. They are then sent to the annealing furnace to remove the hardness and brittleness, and from there to the finishing rolls, or "rolls of precision," through which they are passed four times to develop the thickness and uniformity required for the production of coining blanks. This part of the process has been so perfected as practically to do away with the draw-bench formerly used. At this stage the double eagle strip has attained a length of 47⅜ inches, a width of 1⅝ inches, and has been reduced to a thickness of 7-64 inch. The strips are now taken to the cutting machines, where they are tested for correct weight, and are next converted into coin blanks, or planchets, by means of a steel punch working in a matrix.

These planchets are now cleansed and carefully sorted. A slight variation is permitted by law, for gold coins one-half grain in eagles and double eagles, and one-quarter grain in half and quarter eagles; and one and one-half grains for silver dollars. The process has been reduced to such precision, however, that seldom more than one coin in a million is found beyond the legal tolerance. All the coins that are under the legal weight are thrown out to be remelted; those above legal weight are filed down; and the rest are divided into three groups:

"standards," of exact legal weight; "heavies," above the standard but within the legal variation; and "lights," below the standard but within the allowance. These three groups are kept separate until the coins are finished and placed in bags by the coiner.

Next comes the milling process, by which the raised rim is produced around the edge of the coin to prevent abrasion. The planchets are then again annealed, cleaned and brightened, after which they are ready for the stamping presses. These are marvelous products of mechanical skill. They work automatically, the only hand action being to fill the vertical tubes which feed the planchets to the presses. The blanks are seized one by one from the bottom of the tube by automatic fingers and are centered between the two dies within a collar a little larger than the piece to be stamped. The dies are brought together by the operation of a toggle joint with a pressure varying from 175 tons for double eagles to 40 tons for ten-cent pieces. This impact stamps the metal and forces it to spread out and fill the collar, which is grooved on the inside and puts the fine reeding on the edge of the coin. The finished coin is then automatically passed on and is followed by others. The large coins are stamped at the rate of 80 or 90 a minute, the small coins at the rate of 100 or 120. The finished coins are counted and made up into drafts, the lighter and heavier groups being so mixed as to make practically exact weight. The gold drafts of $5000 each, weighing 268.75 troy oz., allow a variation of not more than .01 oz. The silver drafts are $1000 each, the dollars weighing 859.375 oz., and the subsidiary silver 803.75 oz. with a tolerance of .02 oz. After the perfected drafts are made up they are weighed in the presence of the superintendent of the mint, enclosed in canvas bags and delivered into his keeping.

The director of the mint is required to report annually the amount and kinds of coins minted during the year. At stated intervals he also reports the value of the coins of other countries in terms of United States money, so that the value of goods imported may be determined and the customs duties thereon. In addition to the coining of money, it is a part of the work of the mints to strike such metals as may be ordered by Congress. See MONEY, subhead *Coinage*.

**Min'to, Gilbert John Elliot-Murray-Kynynmond,** FOURTH EARL OF (1845-1914), a governor-general of Canada. He entered the Turkish army in the war with Russia in 1877; and served under Lord Roberts in the second Afghan War in 1878-79. In 1881 he was secretary to Lord Roberts in his mission to the Cape, and was military secretary to Lord Lansdowne while the latter was governor-general of Canada from 1883 to 1885. He succeeded to the earldom in 1891, and seven years later was appointed governor-general of Canada, holding his office until 1904. During his administration the Prince and Princess of Wales visited the colonies. From 1905 to 1910 he was viceroy and governor-general of India.

**Minuit,** *Min' u it,* or **Min'newit, Peter** (1580-1641), a director of New Netherland under the Dutch West India Company (1625-1631). Purchasing Manhattan Island from the natives, he built Ft. Amsterdam on the present site of New York City. Later, in the service of Sweden, he established Ft. Christina (Wilmington, Del.).

**Minutemen,** *Min' it men,* in American Revolutionary history, the name given to a special portion of the organized militia which comprised those New England volunteers who, while following their usual occupations, promised to be prepared for a call to arms at a minute's notice. They fought at Lexington.

**Mirabeau,** *Me" ra" bo',* **Gabriel Honoré Riquetti,** COMTE DE (1749-1791), a statesman and orator of the French Revolution. About 1784 he began his literary career and in 1789 he was elected to the States-General as representative

of Aix. His eloquence and solid statesmanship soon made him the chief of the assembly. It was he who really began the Revolution by his bold refusal to obey the royal command that the delegates of the Third Estate should organize as a separate order. He was an ardent reformer, but he also foresaw the violence toward which the country was tending. To avert the catastrophe, he tried to influence Louis XVI to agree to a constitutional monarchy. He was the only great statesman of the early days of the Revolution and his early death was an irreparable loss to his country. See FRENCH REVOLUTION.

**Miracle,** *Mir' a k'l,* an event or effect brought about by a suspension or acceleration of the laws of nature, through the agency of God. In the New Testament the word *miracle* is used to translate three Greek terms, *sign, wonder, mighty work,* representing three aspects of the Christian miracles. As a *sign,* a miracle was an indication or proof of divine power or approval; as a *wonder,* it represented the mental attitude it inspired in the beholder; as a *mighty work,* it showed the presence of God. Christ appealed to his miracles as proofs of his divine calling, and it is as *signs* that miracles are chiefly regarded in the Christian dispensation. The older idea of a miracle was that the Divine Agency worked in opposition to natural laws. Modern theologians incline to interpret a miracle, not as an event resulting from opposition to natural law, but as a working out of orderly processes through a secret manipulation of the laws of nature. Christians distinguish between the preternatural effects accomplished by other spiritual agencies, such as devils, and true miracles, which are attributed to God alone.

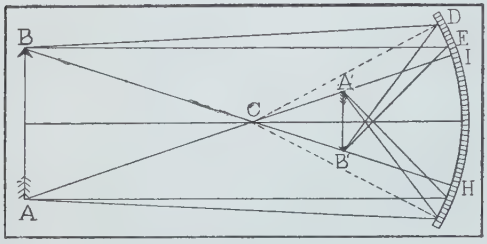
**Mirage,** *Me rahzh',* an atmospheric phenomenon occurring frequently in certain localities. In deserts it often happens that the atmosphere during motionless intervals becomes abnormally heated near the surface and that in the absence of mixing currents there is a well-defined boundary between the surface layer and the cooler layer above. This bounding surface has the same reflecting property as a mirror placed horizontally. An observer above this boundary sees reflected objects above and beyond its surface; if below, he sees objects below the boundary reflected, the images in each case being inverted, according to the law of reflection. In this way the reflection of a ship may be seen when the vessel itself is below the horizon.

One kind of mirage is due to the refraction, or bending of light rays from objects. This sometimes gives rise to a double mirage, in which the same object is reproduced twice. Such mirages are very deceptive in the desert, as they sometimes give the appearance of oases, with the trees in their natural position; below is the inverted mirage, which has the appearance of a reflection. A common type of mirage is that in which the blue sky is so reflected as to give the appearance on the desert of a vast lake, the delusion being reinforced by the oscillating waves of heat which appear to be ripples on the water.

**Mir'ror,** a true and polished surface used for reflecting light. Mirrors are made plane and curved, the curved ones having usually spherical or parabolic surfaces. A plane mirror forms a virtual erect image of an object, the image appearing to be as far behind the mirror as the object is in front of the mirror; the image of one's face in a common mirror is an example. Spherical mirrors are used in scientific work and may be either convex or concave. A convex mirror forms a reduced erect virtual image of an object, the image appearing to be behind the surface but closer to the surface than the object is. Such an image of a near-by object is seen when looking at any polished metal sphere. Each small diverging pencil of light emanating from a point of the object and reflected by the mirror to the eye is rendered more divergent, and therefore appears to be coming from a point situated behind the surface and closer to the surface than the object is.

Convex mirrors accordingly correspond to concave lenses in regard to the character of the images they form.

A concave mirror forms either a real or a virtual image according as the object is placed beyond the principal focus of the mirror or between the principal focus and the mirror. The principal focus is situated halfway between the mirror and the center of the spherical surface forming the mirror, and it is the point to which the rays or pencils of light from a distant object are converged by the mirror. Each small diverging pencil of light leaving a point of the object and reflected by the mirror is rendered less divergent or made




CONCAVE MIRROR

convergent; in the first case the reflected light appears to be coming from a point behind the mirror and farther from the surface than the object is, as is apparent on observing the enlarged image of one's face in a concave shaving glass; in the second case the convergent reflected pencil comes to a point in front of the mirror and thus forms a real inverted image of that point of the object, as seen in the illustration, where AB is the object and A'B' the inverted image. In the character of the images formed, concave mirrors correspond to convex lenses.

Concave, parabolic mirrors, from a few inches across to five feet across, are used in reflecting telescopes. Such mirrors form far more accurate images of distant objects, like the heavenly bodies, than do spherical mirrors, and are free from many of the defects of large lenses. See LENSES; TELESCOPE; SOLAR ENGINE; LIGHT, subhead *Reflection of Light*.



**Mishawaka,** *Mish" a wah' ka,* **Ind.,** a city of St. Joseph Co., 4 m. e. of South Bend, the county seat, on the St. Joseph River and on the Lake Shore & Michigan Southern, the Grand Trunk and other railroads. There is an abundance of water power which contributes to the city's manufacturing interests. It has flour mills and manufactories of heavy machinery, windmills, felt boots, rubbers, furniture, church organs, gas engines, launches, pulleys, wagons and carriages, paper, pulp, agricultural implements and hardware. Mishawaka is one of the oldest towns in northern Indiana. It was settled in 1828 and incorporated in 1834 under the name of St. Joseph Iron Works. The change of name was authorized in 1838 by a special act of the Legislature. Population in 1910, 11,886.

**Missionary Ridge, Battle of.** See CHATTANOOGA, BATTLE OF.

**Missions and Missionaries.** The history of missions is the story of the advance and expansion of the Christian Church. During the century following the death of Christ his apostles were devoting their lives to carrying out the command to preach the Gospel to all nations. To the Apostle Paul is due the evangelization of most of Asia Minor and the chief cities of Greece. After the death of Paul, Christianity rapidly spread, until by the time of Constantine (324-337) it had practically covered the Roman Empire. The great missionaries of the fourth and fifth centuries were: Gregory (about 300), who worked in Armenia; Ulfilas (about 325), who gave the Goths the Bible in their own tongue; Frumentius, a Bishop of Abyssinia (about 327); Chrysostom, who founded at Constantinople (404) a training school for Gothic workers; Martin of Tours, who evangelized central Gaul; Valentinus (about 440), apostle of Noricum; Honoratus (about 410), who sent missionaries to France; and St. Patrick, who converted the Irish (about 455).

Between the fifth century and the Reformation the Church brought the Gospel to vast numbers of heathen peo-

ples. Among the most heroic of the early missionaries of this period were the workers from the Celtic Churches of Ireland and the Scottish Highlands, whose efforts bore fruit in Iceland, the Rhine district, Hesse, Thuringia, Bavaria and Alemannia. St. Augustine, first Archbishop of Canterbury, brought the Gospel to the Britons, near the close of the sixth century. Important among later English missionaries was St. Boniface, apostle of Germany (680-755), who died a martyr on the shore of the Zuider Zee. The Scandinavian countries were christianized in the ninth and tenth centuries. Mission work was begun in Bulgaria in the latter part of the ninth century, extending from there to Moravia, Bohemia, Poland and Russia. Vladimir of Russia was baptized in 988, but it was two centuries before Christianity became the dominant religion there. In the 13th century valiant efforts were made by the Franciscan monks to convert the Moslems, and two missionaries of this order penetrated as far as Peking early in the 14th century.

With the opening of the era of discovery and exploration there was added a vast field for missionary endeavor, and we find the monarchs who sent expeditions to the New World were actuated partly by a desire to evangelize the inhabitants of the newly-acquired lands. The Reformation gave rise to one of the greatest missionary agencies the world has ever seen—the Order of Jesuits. The Jesuits were not only active in Europe, but their efforts extended to various Eastern countries and to North and South America. In the beginning of the 19th century Roman Catholic missionary effort was less active than at the time of the Reformation, but in 1822, when the Institution for the Propagation of the Faith was organized, there came a new impetus. Now Roman Catholic missions are world-wide and highly successful. In 1908, among non-Christians, there were 7933 European priests, 5837 native priests, 5270 lay brothers, a native membership of 7,441,215 and 43,000 mission stations.



Permanent missionary effort among Protestants dates from 1793, when William Carey, an Englishman, went to India to work among the Hindus. Since then practically all of the Protestant bodies have established successful and well-organized missionary societies. Along with these agencies, Bible and tract societies have come into existence, such as the American Bible Society (1816) and the American Tract Society (1823). In the United States also originated the great Student Volunteer Movement, which has bands of students in various important colleges and universities, consecrated to some line of missionary work. Students' associations in America, Europe, Asia and Australia, over 150 in number, are now united together in a great International Student Federation. The Ecumenical Missionary Conference, held in New York in 1900, showed the achievements of missionary workers, and, as a result of the interest then awakened, there came the Laymen's Missionary Movement. The most significant event in the history of modern missions was the assembling of the World Missionary Conference at Edinburgh in 1910, an event that has greatly helped to unite Christians of all lands in the work of evangelizing the world.

**Mississippi,** *Mis″ i sip′ y,* The Bayou State, one of the South Central States, also known as one of the Gulf States, is bounded on the n. by Tennessee, on the e. by Alabama, on the s. by the Gulf of Mexico and Louisiana and on the w. by Louisiana and Arkansas. The Mississippi forms most of the western boundary.

Size. The greatest length from north to south is 330 m. and the greatest breadth is 188 m. The average breadth is 150 m. and the area is 46,865 sq. m., of which 503 sq. m. are water. Mississippi is about the size of Pennsylvania and Rhode Island combined, or about the size of Tennessee and Connecticut. It is a little smaller than Louisiana and the 31st state in area.

Population. In 1910 the population was 1,797,114. From 1900 to 1910 there

was a gain in population of 245,844, or 15.8 per cent. There are 38.8 inhabitants to the square mile and the state's rank in population is 21.

Surface. The state as a whole is low and level. The highest elevation is in the northeastern part and has an altitude of about 1000 ft. Extending through the state from north to south is a low divide separating the streams that flow into the Gulf from those that flow into the Mississippi. To the east of this divide the surface is generally rolling with occasional hills. To the west of it the surface slopes to the bottom lands of the Mississippi. The region between the Mississippi and the Yazoo rivers is known as the Yazoo Delta. Most of the bottom lands are below the level of the river and are prevented from overflowing by levees (See Levee). The coast is irregular and has several indentations, all of which are shallow. There are a number of islands along the coast belonging to the state.

Rivers. The rivers east of the divide flow directly into the Gulf of Mexico or into the Tombigbee, thence into the Gulf. There are the Tombigbee, the Pascagoula, formed by the Chickasawha and the Leaf, and the Pearl. The rivers flowing into the Mississippi are the Yazoo, the Big Black and the Homochitto.

Climate. Mississippi has a mild, equable climate. The summers are long, but the heat is not intense, owing to the influence of the Gulf breezes. In the northern part of the state ice from one to two inches thick occurs in winter, but in the southern part frost is practically unknown. The winters are short and pleasant. Biloxi, Gulfport, Pass Christian and other towns are favorite winter resorts for people from the North. The annual rainfall varies from 48 inches in the north to 58 inches in the south. The heaviest rains occur in the late winter and early spring.

Minerals and Mining. Clay, marl, phosphate rock, cement rock, gypsum and mineral waters are the chief minerals of the state. Mineral waters are bottled and sold in paying quantities at Vossburg and Raymond. Sandstone, limestone and fuller's earth are also found.

Forests and Lumber. The state contains extensive forests of yellow pine, oak, poplar, ash, hickory and other woods. The largest pine forests are in the south and extend inland from the seacoast for about 150 m. Lumbering is an important industry, as is the production of tar, turpentine and rosin. The yellow pine is chiefly used for lumber, although some hardwood lumber is produced.

Agriculture. Agriculture is the chief industry and for it the state has special advantages of soil and climate.

*Soil.* It is claimed that nowhere else in the world is there soil of such depth and richness as that found in the bottom lands of Mississippi, and in the higher levels the soil is scarcely less fertile.

*Products.* Cotton is the chief crop of a large part of the state and the annual yield amounts to about 1,300,000 bales. Corn is next in importance and is raised in all parts of the state. Oats, wheat, alfalfa, rice, hay, sweet potatoes, peanuts, tobacco and garden vegetables are also raised in paying quantities. All fruits of the temperate regions grow in profusion. Plums, peaches and figs are abundant in the central and northern parts of the state, and oranges are grown successfully in the south. In this part of the state considerable sugar cane is also raised The raising of live stock is also becoming an important branch of agriculture.

Manufactures. The production of lumber and of lumber and timber products is the leading manufacturing industry. The manufacture of cottonseed oil and cake is next in importance. Then follow cotton ginning and the manufacture of turpentine and rosin, the making of railway cars, the production of flour and other gristmill products and the manufacture of cotton goods, which is a recent but rapidly-growing industry.

Although Mississippi is not primarily a manufacturing state, since 1890 the

manufacturing industries have developed rapidly and now constitute an important factor in the industrial life of the state.

Transportation and Commerce. Mississippi has over 3000 m. of railway. Trunk lines extend throughout the state from north to south and other lines cross these from east to west. The most important systems are the Illinois Central, the Louisville & Nashville, the Yazoo & Mississippi Valley, the Southern, the Kansas City, Memphis & Birmingham and the Mobile & Ohio. The Mississippi and Pascagoula rivers are navigable. Vicksburg, Natchez and Greenville are important ports on the Mississippi and Gulfport is the important seaport. All the large cities and towns have railway communication.

The exports consist of cotton, cottonseed oil and cake, lumber, turpentine and rosin, fruits and agricultural produce, and the imports include the manufactured articles and foodstuffs that cannot be economically produced within the state.

Government. The present constitution was adopted in 1890, and prohibits local, private and special legislation. The executive department consists of the governor, lieutenant-governor, secretary of state, superintendent of public instruction, attorney-general, treasurer and auditor, each elected for four years. The governor, treasurer and auditor cannot succeed themselves nor each other. The Legislature consists of a Senate of 45 members and a House of Representatives of 145 members, all elected for four years. Regular sessions of the Legislature occur once in two years.

The judicial department consists of the Supreme Court of three justices appointed by the governor and approved by the Senate for nine years, and Circuit and Chancery courts for which justices are appointed for four years.

Mississippi has been one of the leading states in recognizing the rights of married women. The first law for establishing these rights was passed in 1839, and under the present constitution married women are placed on an equality with their husbands in acquiring and disposing of property and in making contracts relative to these transactions. The liquor traffic is prohibited throughout the state.

Education. The public schools are under direction of a state superintendent of public instruction and of a board of education consisting of the state superintendent, secretary of state and attorney-general. There is a county superintendent in each county. Schools for white and colored children are maintained. There is a normal department for training white teachers in the state university. Revenue is derived from a special school fund and from a poll tax and appropriations made by the state. Schools are making good progress and the educational system of the state is becoming more nearly complete and efficient each year. Cities and towns contain graded schools and high schools. The University of Mississippi at Oxford is the leading educational institution. The agricultural and mechanical college is at Starkville. There is an industrial institute and college for girls at Columbus, a state normal school at Hattiesburg, and the Alcorn Agricultural and Mechanical College for colored students is at Westside. The higher educational institutions not under control of the state are Mississippi College at Clinton, Millsaps College and Bellhaven College at Jackson, Whitworth College at Brookhaven and Blue Mountain College at Blue Mountain. Rust University at Holly Springs and Tougaloo University near Jackson are for colored students.

State Institutions. Hospitals for the insane are maintained at Jackson and Meridian. There is also a state hospital at Natchez and another at Vicksburg. The schools for the deaf, dumb and blind are at Jackson. The state penitentiaries are located on farms owned by the state.

Cities. The chief cities are Jackson, the capital; Meridian, Natchez, Vicksburg, Greenville, Columbus, Biloxi, Yazoo, Hattiesburg, Laurel and Gulfport.

History. Mississippi, from the Algonquin "Great River," was visited by De Soto in 1541, by Marquette and Joliet in 1673, and claimed for France by La Salle in 1682. The first settlement was made at Biloxi by D'Iberville in 1699. Rosalie (Natchez) was settled in 1716. The territory was ceded to Great Britain in 1763, and its southern section, called West Florida, was given to Spain in 1781. Two years later parallel 31° was set as the northern boundary of West Florida, but Spain did not agree to this boundary until 1795. In 1798 Mississippi Territory was organized, in 1817 it became a state, and in 1821 Jackson, the capital, was founded. During 1832-34 the Indians removed across the Mississippi. The state seceded Jan. 9, 1861. It was the scene of the battles of Corinth, Port Gibson and Vicksburg. Having adopted a new constitution, 1869, and ratified the Fourteenth and Fifteenth amendments, Mississippi was readmitted February, 1870. In the decade up to 1870, property valuation dropped from about $600,000,000 to about $200,000,000. Since the new constitution of Nov. 1, 1890, voting has been limited to those, otherwise qualified, who can read or interpret any part of the constitution. In 1910 the birthday of Robert Lee was made a public holiday. Consult Tracy's *Mississippi as It Is;* and Riley's *History of Mississippi.*

Governors. David Holmes, 1817-1820; George Poindexter, 1820-1822; Walter Leake, 1822-1825; Gerard C. Brandon, 1825-1826; David Holmes, 1826; Gerard C. Brandon, 1826-1832; Abram M. Scott, 1832-1833; Charles Lynch, 1833; Hiram G. Runnels, 1833-1835; John Anthony Quitman, 1835-1836; Charles Lynch, 1836-1838; Alexander Gallatin McNutt, 1838-1842; Tilghman M. Tucker, 1842-1844; Albert Gallatin Brown, 1844-1848; Joseph W. Matthews, 1848-1850; John Anthony Quitman, 1850-1851; John Isaac Guion, 1851; James Whitfield, 1851-1852; Henry Stuart Foote, 1852-1854; John Jones Pettus, 1854; John J. McRae, 1854-1857; William McWillie, 1857-1859; John Jones Pettus, 1859-1863; Charles Clark, 1863-1865; William Lewis Sharkey, 1865; Benjamin Grubb Humphreys, 1865-1868; Adelbert Ames, 1868-1870; James Lusk Alcorn, 1870-1871; Ridgley Ceylon Powers, 1871-1874; Adelbert Ames, 1874-1876; John Marshall Stone, 1876-1882; Robert Lowry, 1882-1890; J. M. Stone, 1890-1896; Anselm Joseph McLaurin, 1896-1900; Andrew Houston Longino, 1900-1904; James Kimble Vardaman, 1904-1908; Edmund Favor Noel, 1908-1912; Earl Brewer, 1912—. Governors are not eligible for immediate reelection.

**Mississippi River,** the chief river of the United States and with its longest tributary, the Missouri, the longest river in the world. The Mississippi rises in Elk and Itasca lakes in the northern part of Minnesota and flows southward into the Gulf of Mexico. The length of the main stream, including its windings, is about 2500 m., and the combined length of the Mississippi and Missouri is 4200 m. The Mississippi is generally considered navigable to the Falls of St. Anthony, 2160 m. from its mouth, but navigation for river steamers ends at St. Paul 13 m. below. Above the falls the river is navigable for small boats. The Mississippi is estimated to have over 100,000 tributaries, 240 of which are large enough to be shown on a map drawn on a comparatively small scale; 45 of the tributaries are navigable, and their navigable mileage aggregates over 15,000. The area drained by the Mississippi and its tributaries is about 2,257,000 sq. m., or more than two-thirds the area of the United States, exclusive of Alaska. The large tributaries from the west are the Minnesota, the Des Moines, the Arkansas and the Red; those from the east are the Chippewa, the Wisconsin, the Illinois and the Ohio.

In the upper part of its course the Mississippi flows between high banks, along which, in some sections, are beautiful bluffs from 200 to 300 ft. in altitude. Below St. Paul it forms a broad expanse of water known as Lake Pepin. Between the falls of St. Anthony and

the junction with the Missouri, the Mississippi flows through a valley remarkable for its beauty. Below the Missouri the flood plain becomes broad and low, gradually descending to the level of the river and then below the confluence with the Ohio to a surface lower than that of the river. From here to the sea the surrounding country has to be protected in many places by artificial embankments (See LEVEE; JETTY). Below the Missouri the Mississippi is broad and muddy. From St. Louis to the Gulf the average velocity of the current is less than three miles an hour. In the lower part of its course the river carries great quantities of silt, which is constantly being deposited on its bed. By this means the river has raised its bed until it is higher than the surrounding country. This silt is also the cause of the large delta at the mouth, through which the river enters the sea by a number of channels. By the construction of jetties the channel known as the South Pass has been deepened so that large ocean vessels can ascend to New Orleans. The Mississippi forms the boundary between ten states, as follows: Minnesota and Wisconsin; Iowa and Illinois; Missouri, Illinois, Kentucky and Tennessee; Arkansas, Tennessee and Mississippi; Louisiana and Mississippi. The chief cities on its banks are Minneapolis, St. Paul, St. Louis, Memphis, Baton Rouge and New Orleans.

**Mississippi, University of,** at Oxford (1844). Opened in 1848, but closed from 1861 to 1865, this university receives interest from the state on more than $500,000, representing the valuation on a township of land granted by Congress in 1819. A second township was granted in 1892 and the total endowment is about $700,000. Its buildings and grounds are valued at more than this amount. The university offers courses in arts, science, pedagogy, philosophy, engineering and mining. It also has departments of law and medicine and maintains a summer school. The library contains about 30,000 volumes. There are some 400 students.

**Missoula,** *Mi zoo' la,* **Mont.,** the county seat of Missoula Co., situated on the Missoula River and on the Northern Pacific, the Chicago, Milwaukee, & Puget Sound and other railroads, 125 m. w. of Helena. The city occupies a beautiful site in a valley surrounded by mountains. The city is the natural outlet of the Bitter Root Valley and has an important trade in fruit and agricultural produce. Coal is mined in the vicinity and at Bonner. Seven miles distant is a water-power plant which furnishes the city with electricity. Ft. Missoula, a United States military post, is just without the city limits. The city has large sawmills and other manufactories. It is the seat of the University of Montana and has several denominational schools and a business college. Missoula was founded in 1864 and chartered as a city in 1887. It was the first city in Montana to adopt the commission plan of government. Population in 1910, 12,869.

**Missouri,** *Mis soo' ry,* one of the West North Central States, is bounded on the n. by Iowa, on the e. by Illinois, Kentucky and Tennessee, from which it is separated by the Mississippi River, on the s. by Arkansas and on the w. by Oklahoma, Kansas and Nebraska. The Missouri River forms the northern half of the western boundary.

SIZE. The length from north to south is 287 m. The average breadth is 255 m. and the area is 69,420 sq. m., of which 693 sq. m. are water. Missouri is almost the exact size of Scotland, Ireland and Wales, or of Washington, a little smaller than North Dakota and the 18th state in area.

POPULATION. In 1910 the population was 3,293,335. From 1900 to 1910 there was a gain in population of 186,670, or 6 per cent. There are 47.9 inhabitants to the square mile and the state ranks seventh in population.

SURFACE. That portion of the state north of the Missouri River is an upland plain or prairie region. It is somewhat broken or hilly in the western part and the streams have deep, broad val-

leys. The elevation changes from 500 ft. on the Mississippi to about 1200 ft. in the northwest corner of the state. South of the Missouri the state is divided into two regions, that occupied by the Ozark Plateau and the lowlands in the southeast. The Ozark region, or Ozark Plateau, has for its distinguishing feature a range of hills extending across the state from east to west. These are low elevations with rounded summits, having altitudes ranging from 1100 to 1600 ft. The Ozark Plateau extends northward from these hills to the central part of the state. The lowlands in the southeast have an area of about 3000 sq. m. This region has an undulating surface and in its lowest parts it is marshy, containing numerous lagoons. Some of the lowest land is protected from the Mississippi by levees. There are high bluffs along the Mississippi and Missouri, some of which have an altitude of 150 ft. above the water.

Rivers. The state is drained directly or indirectly into the Mississippi. The Missouri, flowing across the state from west to east a little north of the median line, drains by far the greater part of its surface. Its chief tributaries from the north are the Platte, the Grand and the Chariton, and from the south the Osage, the Gasconade and the Lamine. The Wyaconda and the Salt drain the northeast corner of the state directly into the Mississippi. The St. François drains the southeast corner. The Meramec flowing northeasterly drains the south-central part of the Ozark region into the Mississippi. The White and Black flow southward into Arkansas.

Scenery. Several streams of the White system have canyonlike gorges in their lower courses. In the Ozark region in the southwestern part of the state, especially in Stone, Christian, Greene and McDonald counties, are numerous caverns, some of which are of unusual interest. Marble Cave in Stone County contains a room which is 325 ft. long and 125 ft. wide and has a vaulted roof rising from 100 to 195 ft. In Camden County is Hahatonka Park, of 5400 acres. This park contains a number of natural curiosities, including seven caves, a balanced rock, a natural bridge and a large amphitheater with remarkable acoustic properties.

Climate. The climate of Missouri, unprotected by mountain ranges and lying far from the ocean, is one of extremes in heat and cold, moisture and drought. The mean annual temperature is 54.6°, the lowest average being in the extreme northwestern counties, where it is slightly below 50°. In the extreme southeastern counties it about 60°. July is the warmest month, January the coldest. In the summer months the temperature occasionally reaches 100°. In winter, extreme cold waves sometimes sweep over the state, but periods of extreme cold or of extreme heat are not usually of long duration. The mean annual rainfall is 39.17 inches; the rainfall varies from about 35 inches in the northwestern plateau to nearly 45 inches for the southeastern lowlands. The snowfall ranges from about 10 inches in the southeastern to about 25 inches in the northwestern portion of the state.

Minerals and Mining. The coal fields of Missouri have an area of 23,000 sq. m. and coal constitutes the state's most valuable mineral resource. These fields are a continuation of the coal fields in Kansas and Iowa and lie north and west of a line extending from Springfield to Hannibal. In the Ozarks are extensive deposits of iron ore, the largest being at Pilot Knob and Iron Mountain. The ore here is practically inexhaustible, though the mines are not yet extensively worked. Missouri is the leading state in the production of lead and zinc, and has large mines in the vicinity of Joplin and at Webb City, Granby and Aurora. Clay suitable for common brick and fire brick is found in nearly all parts of the state, and limestone, granite, marble, oynx and other building stones occur in large quantities. Cement rock is found in many localities and the manufacture of ce-

MISSOURI

ment and quicklime are important industries. Cobalt and nickel occur with lead, and nearly all the nickel produced in the United States comes from Missouri. Large quantities of barites are mined and used in the manufacture of paint.

Forests and Lumber. In the southeastern part of the state are valuable forests of oak, hickory, elm, maple, ash, locust, yellow pine, cypress and other woods. Forests are also found bordering the Mississippi and the Missouri. Lumbering is an important industry in the southeastern part of the state and in some localities a thriving business is done in providing railway ties. The yearly value of the lumber output is over $10,000,000.

Agriculture. Agriculture is the leading industry and Missouri is one of the important agricultural states. The farms are of medium size and diversified farming is generally practiced.

*Soil.* In the lowlands the soil is a deep, rich alluvium; on the uplands it is usually loam. Throughout the state the soil is generally fertile.

*Products.* Missouri has a great variety of agricultural products. Corn, wheat, rye, oats, buckwheat, barley, tobacco and hay and forage are the principal field crops. All kinds of fruits suited to a temperate climate are grown. Apples, pears, peaches, plums, cherries and small fruits are raised extensively in the central and northern section. In the south apricots, nectarines, grapes and figs are raised. Missouri is one of the leading states in the production of apples, and the production of grapes is such as to result in the making of large quantities of wine. The state is also widely known for the excellent melons raised in the southern part. In some localities garden vegetables are raised for St. Louis and other markets.

Missouri is an important live-stock state. It leads the Union in the number of mules; and horses, cattle, sheep and hogs are found on nearly all farms. The abundance of corn makes the fattening of hogs very profitable. In the Ozark regions conditions are especially favorable to raising sheep, and the production of wool is here an important industry. Dairying and poultry raising also contribute materially to the prosperity of the farmer.

Manufactures. Manufacturing industries have developed rapidly within the last few years, and Missouri is the leading manufacturing state west of the Mississippi. St. Louis is the chief manufacturing center, over two-thirds of the industries being in or around that city. The most important industries are the manufacture of tobacco and tobacco products, slaughtering and meat packing, the production of malt liquors, the manufacture of confectionery, of boots and shoes and of flour and gristmill products, making machinery, printing and publishing, making cars, and the manufacture of clothing, agricultural implements and wagons and carriages. Kansas City and St. Louis are the important manufacturing centers. Joplin is the center for the zinc industry.

Transportation and Commerce. The Mississippi furnishes water connection with New Orleans, and large quantities of freight are shipped by this route. The Missouri is navigable, but owing to the construction of railroads this river is but little used. Missouri has over 10,000 m. of railway. The northern half of the state is crossed by great trunk lines extending east and west; the southern tiers of countries are not yet fully supplied with railway transportation. The most important systems are the Pennsylvania, the Baltimore & Ohio, the Wabash, the Illinois Central, the Alton, the Rock Island and the Burlington, centering in St. Louis from points north and east. The Missouri Pacific, the San Francisco and the Iron Mountain extend from St. Louis west and south. There are numerous cross lines connecting these trunk lines,and the large cities all have electric lines. St. Louis is the great railway center, more than 30 railways entering the city. Kansas City, Springfield and Cape Girardeau are also important railway centers for their respective localities.

Missouri has an extensive commerce with surrounding states. Fruit, vegetables, live stock, corn, wheat and other produce, and manufactured goods are sent to all near-by centers of trade, and some products find their way to other parts of the country. St. Louis is the distributing center for the great region to the south and west and has an extensive wholesale trade. It is also an important point for the transshipment of goods received from states farther east and north. Manufactured goods and some foodstuffs are imported.

GOVERNMENT. The present constitution was adopted in 1875. The executive department consists of a governor, lieutenant-governor, secretary of state, auditor, treasurer, attorney-general and superintendent of public instruction, all elected for four years. The Legislature consists of a Senate of 34 members elected for four years, and a House of Representatives of 142 members elected for two years. The sessions are held biennially and are practically limited to 70 days.

The judicial department consists of a Supreme Court of seven judges elected for ten years; three District Courts of Appeal, each having three judges elected for 12 years; and Circuit Courts, the judges of which are elected for six years. Each county has a County Court and a Probate Court and there are justice courts in villages and towns. The three District Courts are located at St. Louis, Kansas City and Springfield.

EDUCATION. The public school system is under the general supervision of a state superintendent of public instruction. The law requires the maintenance of separate schools for white and colored children. The district is the unit for administration and each school is under the direction of the local board. Schools in towns and cities are well graded and provide high school courses. Many of the rural schools are graded and have a uniform course of study. Throughout the state the public schools are increasing in efficiency each year. State normal schools are maintained at Warrensburg, Kirksville, Cape Girardeau, Springfield and Maryville. Lincoln Institute at Jefferson City is for training colored teachers. The University of Missouri, which is at Columbia, has organic connection with many affiliated high schools.

The higher institutions not under control of the state are Washington University at St. Louis, St. Louis University, William Jewell College at Liberty, Drury College at Springfield, Central College at Lafayette, and Westminster College at Fulton.

STATE INSTITUTIONS. The hospitals for the insane are at Farmington, Fulton, Nevada and St. Joseph. The school for the deaf and dumb is at Fulton and the school for the blind at St. Louis. The institute for the feeble-minded is at Marshall and there is a state tuberculosis sanatorium at Mt. Vernon. The state prison is at Jefferson City; there is a boys' reform school at Boonville and a girls' reform school at Chillicothe.

CITIES. The chief cities are Jefferson City, the capital; St. Louis, Kansas City, St. Joseph, Springfield, Joplin, Sedalia, Hannibal, Cape Girardeau, Carthage, Moberly, Nevada, Chillicothe and Independence.

HISTORY. Missouri, from the Algonquin and Dakota "Great Muddy" (river), was explored by De Soto in 1541, touched by Marquette and Joliet in 1673 and claimed for France by La Salle in 1682; Ste. Genevieve, 1755, was the first permanent settlement. In 1764, St. Louis was settled by Pierre Laclède Ligueste. By the Treaty of 1763, Missouri fell to Spain. In 1800 it was given to France and became a part of the United States through the Louisiana Purchase in 1803. Missouri Territory, having been organized in 1812, was admitted as a state, 1821, after a long period of contest (See MISSOURI COMPROMISE). The *Enterprise,* 1815, was the first steamboat on Missouri waters.

On the question of slavery and secession, the state was divided, and, though controlled by the Union forces during the war, it furnished about 30,000 troops for the South against about 100,000 for

the North. It alone, early in 1865, voluntarily freed its slaves. Since the Civil War, Missouri has enjoyed phenomenal prosperity. The St. Louis Exposition, 1904, celebrated the centennial of the Louisiana Purchase. Consult Carr's *Missouri,* in the American Commonwealths Series.

GOVERNORS. Alexander McNair, 1820-1824; Frederick Bates, 1824-1825; Abraham J. Williams, 1825; John Miller, 1825-1832; Daniel Dunklin; 1832-1836; Lilburn W. Boggs, 1836-1840; Thomas Reynolds, 1840-1844; M. M. Marmaduke, 1844; John C. Edwards, 1844-1848; Austin A. King, 1848-1853; Sterling Price, 1853-1857; Trusten Polk, 1857; Hancock Jackson, 1857; Robert M. Stewart, 1857-1861; Claiborne F. Jackson, 1861; Hamilton R. Gamble, 1861-1864; Willard P. Hall, 1864-1865; Thomas C. Fletcher, 1865-1869; Joseph W. McClurg, 1869-1871; B. Gratz Brown, 1871-1873; Silas Woodson, 1873-1875; Charles H. Hardin, 1875-1877; John S. Phelps, 1877-1881; Thomas T. Crittenden, 1881-1885; John S. Marmaduke, 1885-1887; Albert P. Morehouse, 1887-1889; David R. Francis, 1889-1893; William J. Stone, 1893-1897; Lon V. Stevens, 1897-1901; Alexander M. Dockerey, 1901-1905; Joseph W. Folk, 1905-1909; Herbert S. Hadley, 1909-1913; Elliott W. Major, 1913—. Governors cannot succeed themselves in office.

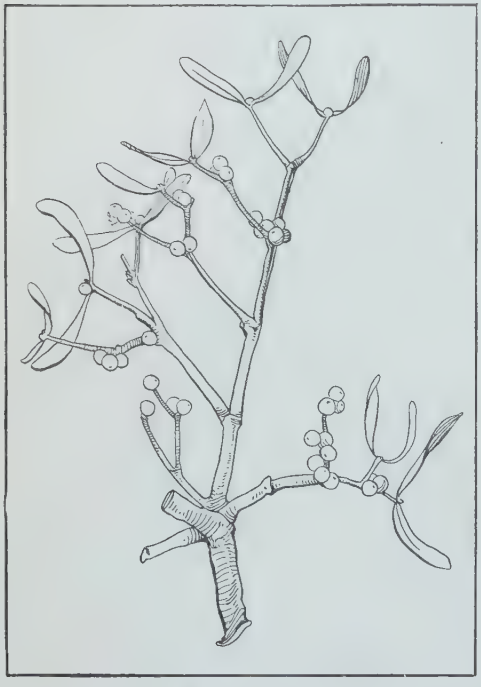
**Missouri Compromise,** an important law passed by the United States Congress in March, 1820. In 1812, when Louisiana was admitted into the Union, the South had an equal number of states with the North, and since then the balance had been kept even. With the admission of Alabama in 1819 as a slave state there were 11 slave states and an equal number of free states. Soon after, the question of the admission of Maine and Missouri came up for discussion in Congress. If both were admitted as free states the balance would be disturbed, and the pro-slavery faction vigorously opposed any restriction against slavery in the Missouri bill. In 1820 a compromise was effected whereby Maine was to be admitted as a free state and Missouri as a slave state, but thereafter slavery was to be forever prohibited in the territory north of parallel 36° 30′, the southern boundary of Missouri. This famous compromise had the strong support of Henry Clay, then speaker of the House. It adjusted matters for a number of years, but was repealed by the Kansas-Nebraska Bill. See KANSAS-NEBRASKA BILL.

**Missouri River,** a large river of the United States and the chief tributary of the Mississippi. It is formed by the junction of the Gallatin, the Jefferson and the Madison rivers, or forks, which have their sources in the Rocky Mountains and unite at Gallatin City in the southwestern part of Montana. The Missouri flows northward, then eastward into North Dakota, thence in a southeasterly direction to Kansas City, from which point it flows across Missouri and enters the Mississippi 20 m. above St. Louis. From its source to its junction with the Mississippi, including the Jefferson, it is about 3000 m. long and exceeds in both length and volume the Mississippi above their junction. The area of its basin is about 800,000 sq. m. The Missouri is a rapid, muddy stream. At Great Falls there is a series of cataracts, and the river descends about 400 ft. in a distance of 15 m. The chief tributaries are the Yellowstone, the Platte and the Kansas from the west, and the James and the Big Sioux from the north. During high water the Missouri is navigable to Fort Benton, Mont., about 2300 m. from its mouth, and during low water, steamers ascend the river as far as Fort Buford, N. D. The chief cities along its banks, proceeding down stream, are Helena, Great Falls, Bismarck, Pierre, Sioux City, Council Bluffs, Omaha, Nebraska City, St. Joseph, Leavenworth, Kansas City and Jefferson City.

**Missouri, University of,** at Columbia (1839). This is the oldest state university west of Indiana. It opened in 1841, the same year as the University of Michigan, and it early became a coedu-

cational institution. The state college of agriculture and mechanic arts is a department of the university. It includes a school of mines, at Rolla. At Columbia it has an experimental farm of 650 acres. It has a graduate department and departments of education, law and medicine, besides its college for undergraduates. Its endowment exceeds $1,250,000 and its annual receipts exceed $700,000. The library contains over 110,000 volumes. There are about 2500 students.

**Mistletoe,** *Mis' 'l to,* a parasitic shrub of the Mistletoe Family depending for its subsistence upon the life of other trees. It grows chiefly upon the limbs of oaks,



MISTLETOE

apples, cypresses, elms and maples, but may be found upon evergreen trees. The growth begins by the berry, which is sticky, adhering to the branch of some host plant upon which it has fallen, and there remaining until the coat of the berry exposed to the air has hardened. As the embryo grows, its only means of escape from this shell is through the still soft portion next the bark. It enters the tree, takes root and begins to put forth stems which are angular in form and of a yellowish-brown color. The leaves, which are long-oval, are of the same characterless color, but when the sunlight shines through them they take on a beautiful gold. In American species the leaves remain unwithered until the new growth appears. The flowers are insignificant, growing on spikes about the length of the leaves. In August or September a semitransparent berry appears which adds greatly to the mystic charm of the plant.

Mistletoe grows in the United States from Illinois southward. That used in England is produced in the apple orchards of Normandy. Many ancient Druidic legends are centered about the mistletoe, and by long-established custom it remains in England and the United States one of the emblems of the Christmas season. It is the state flower of Oklahoma.

**Mitchell,** *Mich' el,* **Donald Grant** (1822-1908), best known as Ik Marvel, an American author, born in Norwich, Conn. He graduated at Yale in 1841 and after studying law for some time took up literature. Ill health drove him to an outdoor life and this brought about an interest in landscape gardening and agriculture. He became consul at Venice in 1853 and was a United States commissioner at the Paris Exposition of 1878. His scope was not wide, nor did he probe deeply into profound subjects, but his dreamy, sentimental writings won for him a wide popularity. Among his works are *Reveries of a Bachelor, Dream Life, a Fable of the Seasons* and *Doctor Johns.*

**Mitchell, John** (1870- ), an American labor leader, born in Will County, Ill. His educational advantages were limited, but he studied law, and later was employed in the coal fields of Illinois. He has been connected with the labor unions since he was 16 years of age, and has held office in the United States Mine Workers of America since he reached his majority, being its president for sev-

eral years after 1899. He is a leader also in the American Federation of Labor, and in the National Civic Federation. He has been commended for his good judgment in the management of the coal workers' strikes of 1900 and 1902, and in other labor movements of great magnitude.

**Mitchell, Maria** (1818-1889), an American astronomer, born at Nantucket, Mass. Her father was a teacher of astronomy, and she gave him considerable assistance in his work. This service resulted in qualifying her for independent work. In 1847 she discovered a new telescopic comet, in recognition of which the King of Denmark awarded her a gold medal. While employed in the coast survey by the government she assisted in compiling the Nautical Almanac. In 1857 she visited observatories in Europe, and was the first woman to be made a member of the Academy of Arts and Sciences. In 1865 she became professor of astronomy in Vassar College, where she continued to serve until her death. She wrote many scientific papers. See ASTRONOMY.

**Mitchell, Silas Weir** (1829-1914), an American nerve specialist and author, born in Philadelphia, Pa. He graduated at Jefferson Medical College in 1850, and became a specialist in the treatment of nervous diseases, developing the method of curing nerve troubles which is known as the "rest-cure." His early writings were medical treatises, but after 1880 he devoted much of his time to literature. Dr. Mitchell published several collections of poems and a number of short stories and novels. His historical novel of the Revolution, *Hugh Wynne, Free Quaker,* was very successful. Other writings are *Adventures of François, Dr. North and his Friends, A Diplomatic Adventure, The Comfort of the Hills, The Red City* and *John Sherwood, Ironmaster.*

**Mitchell, S. D.,** a city and the county seat of Davison Co., 72 m. n.w. of Sioux Falls, on the Chicago, Milwaukee & St. Paul, the Chicago & North Western and other railroads. It is the central market for a rich grain and live-stock region and contains a number of large industrial plants, including grain elevators, creameries, wholesale fruit establishments, brick and lumber yards and railroad and machine shops. Here is located Dakota University, a Methodist Episcopal institution established in 1888. St. Joseph's Hospital, a Carnegie library, an opera house and a city hall are other prominent features. Settled in 1879, Mitchell was incorporated in 1883 and first chartered in 1890. It is now administered under the commission form of government. Population in 1910, 6515.

**Mite,** an order of tiny Arachnids having unsegmented abdomens. Some are parasites, and many are found upon living plants. The best-known mites are the ticks and the red spiders, which are often found upon stems of rosebushes and upon house plants. One species lays its eggs in the leaf of the pear and produces there a modification of the cells known as pear leaf-blister. The cheese mite and itch mite bore into the human skin and cause disease, while the cattle tick infest domestic cattle. See TICK; ARACHNIDA.

**Mit'ford, Mary Russell** (1787-1855), an English novelist and dramatist, born in Alresford. Her most successful work was the series of sketches called *Our Village,* a fresh and sympathetic portrayal of rustic scenes and characters, written with charming grace and humor. Among her other writings are *Miscellaneous Verses, Julian, The Foscari, Rienzi* (the best of her plays) and *Belford Regis,* a novel of country life.

**Mithri"da'tes the Great** (about 134-63 B. C.), King of Pontus. When 13 years of age he succeeded his father. He was a persistent enemy of Rome, and when a young man began his plan to drive the Romans from the East. He had already taken Asia Minor and had led armies into Greece, when he was met and defeated by Sulla. In 74 B. C., after Sulla's death, he again rose against the Romans but was defeated by Lucullus and forced to retreat to Armenia. For the third time he warred against

Rome and had regained the greater part of his possessions when Pompey was placed in command by the Romans, with absolute power in the Eastern provinces. He gained a signal victory over Mithridates near the Euphrates River. Mithridates was well educated, especially in Greek literature, and was a generous patron of learning.

**Mi'vart, St. George Jackson** (1827-1900), an English zoologist, born in London and educated at Harrow, King's College and St. Mary's College. He was lecturer on comparative anatomy and zoology at St. Mary's Hospital, London, and professor of biology in the Roman Catholic University College, Kensington, and of the philosophy of natural history at the University of Louvain, Belgium. He wrote on morphology and the classification of Vertebrates, contributed to the discussion on evolution and attempted to reconcile scientific facts with religious doctrines. His works include *Man and Apes, The Cat, Nature and Thought* and *On Truth.*

**Mo'ab,** a son of Lot, whose descendants, called Moabites, occupied the land immediately to the east of the Dead Sea. They were an idolatrous people, frequently at war with the Israelites. The book of *Ruth,* however, shows that the two peoples were on friendly terms at the time when Naomi and her family "went to sojourn in the country of Moab."

**Mo'abite Stone,** an ancient stone of black basaltic granite discovered in 1868 at Diban, in the ancient land of Moab, by F. Klein, a German missionary. Before it could be removed, it was broken to pieces, but the fragrants were collected, and are now in the Louvre, Paris. The stone is especially interesting because of the inscription which was engraved upon it. This inscription, which is in the Moabitish language, consists of 34 lines and dates from about 860 B. C. It records the deeds of Mesha, King of Moab, and his wars with Omri, King of Israel, and his successors.

**Moat,** *Mote,* a mound and also the excavation made in building the mound; a ditch or canal surrounding a castle, and usually filled with water. The moat was a part of the fortification of a castle during the Middle Ages. It was also called a dike, a ditch and a fosse, and was crossed usually by a drawbridge. In modern times the moat is usually dry; the sides, or scarp and counterscarp, are as steep as possible, generally revetted. See GABION.

**Mo'berly, Mo.,** a city of Randolph Co., 129 m. n.e. of Kansas City, on the Wabash, the Missouri, Kansas & Texas and other railroads. The industrial plants include machine shops, foundries, brickyards, cement works, a large grain elevator, a shoe factory, ice works and a frame factory. An extensive trade is carried on in dairy and farm products, poultry, live stock, wool, hides, lumber, tobacco, flour and bricks. Prominent features of the city are St. Mary's Academy, a Carnegie library, a Y. M. C. A. Building, a commercial college and a hospital. Moberly was laid out in 1866 and incorporated as a town in 1868; it is administered under a revised charter of 1889. Population in 1910, 10,923.

**Mobile,** *Mo beel',* **Ala.,** a port of entry and the only seaport of the state, and the county seat of Mobile Co., situated in the southwestern part of the state on the west bank of the Mobile River at the head of Mobile Bay. The city lies 30 m. n. from the Gulf and 140 m. n.e. of New Orleans, on the Southern, the Louisville & Nashville, the Mobile & Ohio, the Mobile, Jackson & Kansas City, the Tombigbee Valley and other railroads, and on the steamboat lines which connect it with all American ports as well as those of Europe and the Pacific coast. River boats ascend through the navigable waters of the adjacent states, uniting the city in trade with Montgomery, Tuscaloosa, Columbus and even with the Great Lakes. The city lies on a sandy plain that rises gradually to a chain of low hills at the west.

STREETS, PARKS AND PUBLIC BUILDINGS. The residence portion of Mobile is especially attractive because of its wide lawns and broad, well-kept streets.

Magnolia and live-oak trees line all the ways, and shrubs and flowering plants add to the charm. In the business section the streets are also well cared for, being wide and smoothly paved. Aside from its parks, Mobile has many recreation places in the pine groves adjoining the city, and these have become favorite places for winter resorts.

Among the noticeable public buildings are the beautiful Cathedral of the Immaculate Conception, the Church of St. Joseph, a commodious customs-house, the Federal Building, the Southern Market, the armory, a Y. M. C. A. Building, the courthouse, the public library, the United States Marine Hospital, a city hospital, Providence Infirmary and many excellent hotels and office buildings.

Educational Institutions. The University of Alabama, located at Tuscaloosa, has its medical school in Mobile, and among its other educational institutions are the academies of Visitation and of the Immaculate Conception, both for girls, the Convent of Mercy, the Emerson Normal and Industrial School for Negroes, McGill Institute, the University Military School and Mobile Military Institute. Just outside of the city at Spring Hill is Spring Hill College, a Jesuit school.

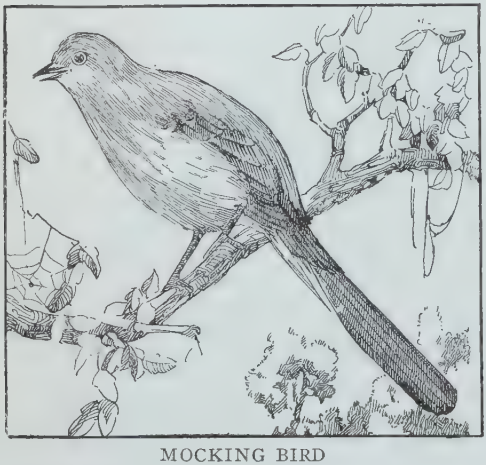
Chief Industries. Owing to its unexcelled position for trade, Mobile is a commercial city of great importance. Its shipment of cotton alone from the great cotton region about it would render the city one of the leading ports of the state. This brings with it the accompanying cotton mills, cottonseed-oil presses and the great cotton exchange. The harbor has been recently deepened and improved to meet the ever-increasing traffic, and this has attracted other industries of greater or less extent. Lumber, timber, naval stores, vegetables, fruits, coffee, coal, sulphur and asphalt are among the other exports. The fishing carried on in the river and bay is a valuable source of income. The manufactories include those of sash and doors, cordage, tobacco and cigars, boats, beer and cedar pencils.

History. Mobile was founded by the French in 1702, and until 1720 was the capital of the Province of Louisiana. With all of the Territory of Louisiana, it was ceded to Great Britain in 1763, but was captured by the Spanish in 1780, under whose possession it remained until 1813; under the authority of the Federal Government it was seized on the claim that it was a part of the Louisiana Purchase. It was, in 1814, the headquarters of Andrew Jackson who there resisted the attack of the English in September. The city charter was granted by the first Legislature of Alabama in 1819. From its strategic position Mobile was an important Confederate seaport in the Civil War, and in spite of an attempted blockade on the part of the Federal troops, trade with the West Indies was kept up until August, 1864, when Admiral Farragut succeeded in passing the Confederate forts and capturing the *Tennessee* and other battleships in the harbor. Later the forts surrendered and Federal troops occupied the city. Since the adoption of the last charter (1887), the city has been prosperous and has advanced rapidly in trade, population and civic improvement. September, 1910, the commission form of government was adopted. Population in 1910, 51,521.

**Mobile Bay, Battle of**, an important engagement of the Civil War, fought Aug. 5, 1864, between a Federal fleet, under Farragut, and an inferior Confederate fleet, under Buchanan, aided by land batteries. Forts Gaines and Morgan guarded the entrance to the bay, within which was a line of sunken torpedoes. Beyond these were Buchanan's vessels and the ram *Tennessee*. Tied to the mast of his flagship, Farragut steamed into the harbor, at the same time bombarding the forts. The engagement was short but furious. Only one torpedo exploded and this wrecked the Union vessel *Tecumseh;* two Confederate gunboats were destroyed, a third was forced to flee and the *Tennessee* was captured. Shortly after, the two forts were captured by a land force under General Granger.

**Moccasin,** *Mok' a sin,* a kind of loose shoe worn by the American Indian. Unlike the sandal, it extends over the top of the foot, the whole being in one piece. Moccasins are made of buckskin, and are flexible and durable; and nothing more practicable as a foot covering ever has been invented.

**Moccasin Snake,** an American member of the Viper Family found in eastern United States, Mexico and Central America; in the Old World it is found only on the shores of the Caspian Sea. The water, or cotton-mouthed, moccasin is a semiaquatic serpent about four feet in length. Its stout, heavy body in color is olive marked with dark blotches; its head is broad and vicious-looking. The moccasin is one of the few deadly American snakes.



MOCKING BIRD

**Mocking Bird,** a family of birds, members of which are about the size of a robin and may be known by their grayish bodies, blackish, white-barred wings and white outer tail feathers, which are conspicuous in flight. Both sexes are alike. The mocking bird is the most gifted of birds in a family noted for its songsters. Not only has it a peculiarly sweet and melodious song, but its powers of imitating the notes of other birds and the sounds of other animals are seemingly endless. As a cage bird it is easily kept in captivity, seeming to prefer the society of man. The nest is built either in undergrowth or in trees like the oak and cedar, and contains four bluish eggs with reddish spots. Though a common bird in the temperate and torrid zones of North and South America, the mocking bird is rare north of Delaware, although occasionally seen as far north as northern Illinois and southern New England.

**Modern Woodmen.** See WOODMEN OF AMERICA, MODERN.

**Mo'doc,** a tribe of North American Indians formerly living near Klamath Lake in southwestern Oregon. They resisted the whites in what is known as the Modoc War, but in 1873 were forced to give up their lands, which had been ceded to the United States in 1864. The greater part of the tribe is now in Oklahoma and the remainder on a reservation near Klamath Lake.

**Moham'med,** or **Mahom'et** (about 570-632), the founder of Islam, or Mohammedanism, born in Mecca, Arabia. His father died before his birth or shortly thereafter, and his mother when he was six years old. Little is known of his early years, as the legendary stories concerning him are wholly untrustworthy. He was cared for by his grandfather and later by his uncle, Abu Talib; assisted in gaining his living by herding sheep and gathering wild berries for the Meccans; and accompanied his uncle on some of his journeys to south Arabia and Syria. In his 25th year he became the agent of Khadija, a wealthy widow 15 years his senior, whom he finally married. He conducted her business at Mecca, made journeys in her interests, and was esteemed for his integrity and good judgment. But this was only one side of his life. From childhood he had been subject to epileptic fits, and these or other causes had developed a somewhat melancholy tendency in his character. He often withdrew to a cave at Mt. Hira, which became his favorite place of meditation, and here his mind dwelt upon the religious conditions of his country. Thus the years passed rather uneventfully until he reached the age of 40, when he announced his revelation and began his work as a prophet.

The time was ripe in Arabia for such a movement. By the year 600, Judaism and Christianity had made an entrance into the country, ancient sects had revived, and religious ferment was undermining the time-honored star-worship of the land, with its pilgrimages, temples and festive ceremonies. Mohammed in his travels had come into contact with the new ideas, as had also been the case in his residence at Mecca, whither pilgrimages were made from every direction. He felt the need of a new religion that should combine the sacred traditions of Arabia with the monotheism and morality of Judaism and Christianity. Like other Oriental prophets, he claimed to have received a divine revelation and commission, when, as he meditated on these things in the solitude of Mt. Hira, the angel Gabriel appeared to him and commanded him to proclaim the true religion of Allah.

When Mohammed declared himself to be the prophet of a new religion he was met with ridicule by his own family. His wife, however, soon came to believe in his claims and other members of his family were converted. By means of his continued private teaching, his doctrine spread, until after four years he had about 40 disciples, mostly people from the lower ranks of life. Now he claimed to receive by revelation a command to come forth as a public preacher, and he vigorously assailed the idolatry of the Meccans, exhorting them to believe in the one true God. This aroused so much opposition that he was compelled to flee, and he went to Medina, where he already had a number of converts. The flight, known as the Hegira, occurred in the year 622 and is reckoned as the beginning of the Mohammedan Era.

The Hegira also marked a turning point in the career of Mohammed. Hitherto he had been regarded as a fanatical imposter, but now he became judge, lawgiver and ruler of Medina. He organized his forms of worship and made every effort to win to his faith the surrounding tribes. He called upon his followers to take up arms for the overthrow of their enemies, and thus committed himself to the spread of his religion by the power of the sword. After various conflicts, which resulted in the gradual conquest of the smaller tribes and a tremendous growth in the number of his enthusiastic followers, he marched against Mecca, which surrendered without resistance and accepted the new religion as the price of the lives of its inhabitants. The sacred Kaaba was purged of its idols and taken over as the shrine of Mohammedanism. This completed the triumph of the new faith in Arabia, and deputations from all the land came to do homage to the prince and prophet.

Meantime Mohammed had written the Koran, which set forth the substance of his revelations and the doctrine of his religion. He had also changed in his own character. His thirst for conquest and power had grown with his success. He began to give way to sensuous practices. After the death of his faithful wife, Khadija, he married several other wives, until at the time of his death he had nine. His conquests meanwhile continued, and in the tenth year of the Hegira he promulgated his great and last pilgrimage to Mecca, known as the "Valedictory Pilgrimage," in which a great throng, variously estimated at from 40,000 to 150,000 pilgrims, accompanied him to the Holy City. He fell sick shortly after his return to Medina, and died in the house of his favorite wife, where he was buried. The house was later annexed to an adjoining mosque and became a place of pilgrimage. See MOHAMMEDANISM.

**Moham'medanism,** the name by which the people of Europe and America designate Islam (entire submission to the will of God), the religion founded by Mohammed Ali in the sixth century A. D. The bible of Islam is the Koran, which is held to be of divine authority, having been revealed to Mohammed by the angel Gabriel. The book of *Psalms,* the Pentateuch and the Gospels of the Christian Bible are also held to be of sacred authority, but in a corrupted form. The Christian prophets are honored, especially Adam, Noah, Abraham, Moses

and Jesus. But Mohammed supersedes them all as the last and greatest. Islam teaches also the reality of angels made of light and of demons made of smokeless fire and subject to death; the resurrection of the dead and final judgment, with rewards and punishments. The God of Islam is the Lord God of Moses and Abraham, perfect in knowledge and power, full of glory, and known as Allah. The common formula of their faith is, "There is no god but Allah, and Mohammed is his prophet." The duties of the followers of Islam include prayer five times a day, with faces turned toward Mecca, giving of alms, fasting and the pilgrimage to Mecca at least once in their life. Chastity, honesty, truthfulness (except in certain cases) and total abstinence from intoxicating drinks are strictly required. Music and games of chance are forbidden, as also images and pictures of living creatures.

Next to Christianity, Islam has more followers than any other religion in the world, and partly because of its acceptance of Christianity and its claim to have progressed beyond it and improved it, it is the greatest barrier to the progress of Christianity in the countries where it is intrenched.

**Mohave,** *Mo hah' ve,* a tribe of North American Indians living in Arizona and California. Their manner of living is stable. They are agricultural and engage in beadwork and the making of baskets and pottery, in which they show remarkable skill.

**Mo'hawk,** a tribe of North American Indians, the chief of the Five Nations of the Iroquois confederacy. They lived in the Mohawk Valley, N. Y. They assisted the colonists in the French and Indian War, but in the Revolution they fought with the English and were driven into Canada. Many of them are farmers in Ontario and New York. See IROQUOIS.

**Mohican,** *Mo he' kan,* a tribe and confederacy of North American Indians belonging to the Algonquian family. They lived in the Hudson Valley and were driven to Massachusetts by the Mohawks. A reservation at Green Bay, Wis., is the home of the few who are not extinct. Branches of the Mohicans were known as Mohegans and Pequots.

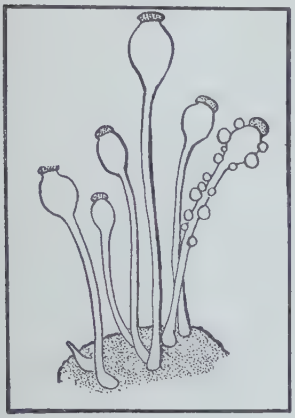
**Mohonk Lake, N. Y.,** a widely-known summer resort and settlement at the northern end of Lake Mohonk, Ulster Co., 14 m. n.w. of Poughkeepsie and 15 m. from Kingston. The lake is situated on Sky Top Mountain, one of the highest peaks of the Shawangunk range, 1245 ft. above sea level. The development of this region and the holding of Indian and arbitration conferences here have been due to Albert Keith Smiley, a member of the United States Board of Indian Commissioners in 1879. The first conference of the friends of the American Indian met here in October, 1883. These conferences have since been held annually, their scope being gradually enlarged to include consideration of other dependent peoples or natives of United States dependencies. The first international arbitration conference was held here in June, 1895.

**Moki,** *Mo' ke,* or **Hopi,** *Ho' pe,* a Pueblo tribe of Shoshonean Indians, occupying seven villages upon three mesas in the north-central part of Arizona. Their villages are situated several hundred feet above the surrounding desert, and are approached by steep trails. The Moki hold to their primitive ways in ceremonial matters, but are industrious farmers and skillful potters and wood carvers. They also weave baskets and blankets. They maintain a rigid clan system. These Indians number about 1600.

**Molas'ses.** See SUGAR.

**Mold,** a fungus growth which occurs on various plants or on animal matter, causing discoloration, and decay of the tissues. The most common are the black, or bread, molds and the blue-green molds, which are commonly noticed on cheese, preserved fruits and decaying animal tissue. The spores, or seedlike bodies, are always floating in the air and are unnoticed if the air is kept circulating freely and is dry. In damp, ill-ventilated rooms or cases, starchy foods soon become coated with the quickly-growing plants, which feed upon the tissues of the

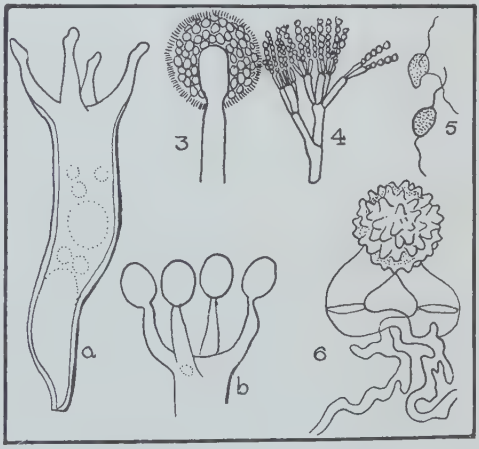
host. The molds are generally white at first and spread by long, threadlike roots, but after a short period of growth they turn blue, green or black. This coloration is due to the production of thousands of tiny spores which become scattered through the air and cause the moldy odor noticeable in damp rooms. Mold spores are killed by excessive heat and for this reason the housewife boils her canned fruit and covers it from the air. The molds are extremely destructive, though sometimes to good purpose in attacking and killing insect pests. Among the common molds are fish molds, which are half parasitic, entering the body of the living fish and feeding upon the tissues until the fish dies; and slime-molds, which are often classed as animals. The best preventive of ordinary molds is fresh, dry air.



BLACK MOLD

**Mole,** a family of burrowing Mammals of the class Insectivora. The moles are almost entirely subterranean in their habits and their build is well adapted to such a life. The body is short and plump, with strong but short legs and a pointed snout. The eyes are small and so well protected by fur or skin that moles have the reputation of being blind. Their ears are very keen, although no external ear is visible. The sense of smell is also acute. The tail is very short or entirely lacking. The underground passages of the mole are dug mostly in pursuit of its prey, slugs, angleworms and burrowing insects, but are also of permanent use as nests and galleries of retreat. The value of the moles' work in digging is beyond estimate, for they not only destroy harmful insects but overturn tons of soil. Moles are found in Europe, America and Africa; those of the United States generally have webbed hind feet and are somewhat aquatic in habits. See Shrew; Shrew Mole; Star-Nosed Mole.

**Mole Cricket,** a queer little insect of the Locustid Family in the order Orthoptera. Its velvety-brown body, from one to one and a half inches in length, may be seen at the surface of the soft soil in which it burrows for food. Like its namesake, the mole, this cricket has much flattened forefeet, with which it digs, and poor eyes. It may be found in damp places near ponds and streams, where it tunnels for earthworms, plant roots and larvæ. Mole crickets are nocturnal and prefer life in their winding tunnels to that in the noisy world without. A species of mole cricket in the West Indies is destructive of the roots of the tobacco and sugar cane.




SPORES OF VARIOUS MOLDS

**Mol'ecule,** a name given by Avogadro (1811), an Italian scientist, to the smallest particle of a chemical substance which can exist alone. A molecule of water is so small that, in order to see it, the drop which contains it would have to be magnified to the size of the earth. We know of molecules mainly through their chemical actions, but the sizes of those of many gases have been determined with comparative accuracy; that

of the hydrogen molecule is $\frac{4}{10,000,000}$, the nitrogen $\frac{3}{1,000,000}$, and the oxygen $\frac{7}{10,000,000}$ of a millimeter.

The union of atoms of similar or dissimilar elements to form a molecule is now considered to be due to an attractive force called cohesion, whose source is electrical. See ATOM; CHEMISTRY; DALTON, JOHN.

**Molière,** *Mo" lyar',* **Jean Baptiste Poquelin** (1622-1673), a French dramatist, born in Paris. On his father's side he was connected with the family of Mazuel, musicians of the French court. He was educated at the Collège de Clermont, and later studied philosophy and law. In 1643, together with the Béjards, he purchased a tennis court and fitted it up as a theater, known as the *Théâtre Illustre,* of which he became manager. The project was unsuccessful, and in 1646 he abandoned it and joined a company of strolling players who were performing in several rural towns. His first comedy, *The Blunderer,* was presented in 1653. At the age of 36, Molière, on his return to Paris, had become familiar with many phases of life both in the country and the cities of France, and this wide observation he applied in the numerous successful works which he soon produced. In 1662 he married Armande Béjard, a sister of some of the members of his first company. It was while he was playing the part of the invalid in his *The Hypochondriac* that a fit of coughing brought about the bursting of a blood vessel, and death followed within an hour.

Molière's picture of society is accurate and picturesque. His playful satire on the foibles of men and their professions was too keen not to win for him enemies who directed violent attacks on him during his lifetime and meddled with his reputation after his death. Though accused of being skilled only in farce, Molière reveals a combined sense of humor and pathos such as is found elsewhere in Shakespeare and Aristophanes alone. His was called the "new comedy;" and it was new in that it was neither romantic nor political, but social comedy, and as a writer of this type he ranks among the greatest in the world. His work is refined, his dialogue is brilliant and alert, and only rarely does the seriousness which came of his too intimate knowledge of all rounds of life become tinged with bitterness. Among his dramas are *Sganarelle, The School for Women, Tartuffe, George Dandin, The Misanthrope, Doctor in Spite of Himself, The Miser, The Knaveries of Scapin* and *Don Juan.*

**Moline,** *Mo leen',* **Ill.,** a city in Rock Island Co. 3 m. n.e. of Rock Island, the county seat, and across the river from Davenport, Iowa, with both of which towns it is in close communication by ferries, steam and electric railways and bridges. The principal railways entering the city are the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific and the Chicago, Milwaukee, & St. Paul. The river furnishes abundant water power at this point, which has been the means of promoting numerous industries and of making the town a commercial center. The city is one of the most important centers in the United States for the manufacture of agricultural implements. Among other articles manufactured are furniture, pianos, organs, elevators, scales, plows, cultivators and corn planters, carriages and wagons, steam engines, boilers and pumps. There are also iron foundries, saw and planing mills, steelworks and machine shops. An extensive trade in lumber, grain, machinery and agricultural implements is carried on. The city has a handsome public library building and a well-equipped city hospital. Population in 1910, 24,190.

**Molino del Rey,** *Mo le' no del Ra',* **(King's Mill), Battle of,** an important battle of the Mexican War, fought Sept. 8, 1847, between 3500 Americans, led by General Worth, and 10,000 Mexicans, commanded by Leon, Perez and Alvarez. General Scott ordered General Worth to make a night attack on Molino del Rey, which was a stone building with high walls and towers. But Scott's plan being impracticable, Worth did not begin

the battle till dawn; then Wright led the storming party, Garland cut off Chapultepec and McIntosh opposed the Mexican right, leaving Cadwalader for the center. Though the Mexicans fought bravely, they were finally compelled to withdraw.

**Mollusca,** *Mo lus' ka,* one of the largest subdivisions of the animal kingdom, including such animals as whelks, slugs, snails, cuttlefish, clams, squids, octopuses and shellfish, whether bivalve or univalve. The members of this group all have a soft internal structure and many of them are protected by shells. The shells, where present, are the product of a secretion produced in the skin, or mantle, of the animal. In bivalves the mantle may be seen lining the shell but free from it at the edges. The space between the flaps of the mantle is called the mantle cavity and contains the gills and other organs. There is no skeleton except in those Mollusks whose shells may be said to form a protective skeleton. The circulatory system is well developed and the nervous system is very complete.

Many Mollusks are free-swimming and push themselves about upon the lake or ocean floor, or burrow in the sand and mud by means of a muscular foot which may be retracted or extended at will. Others spend some time as free-swimming animals, but later, as they mature, find a rock or submerged object to which they cling, depending upon the current of the stream to bring them food. The last-mentioned families are always found in relatively clear waters, where there is no danger of the shells becoming clogged with mud. There are five divisions of Mollusca, three of which are commonly known: the Lamellibranch, including all bivalves; the Gasteropod, including slugs and snails; and the Cephalopod, including the shell-less forms, as the cuttlefish, squid, nautilus and octopus. See CEPHALOPODA; OYSTER; SNAIL; CUTTLEFISH.

**Moloch,** *Mo' lok,* or **Mo'lech,** a heathen god, in the Old Testament called "the abomination of the Ammonites." Jerusalem, during the decline of the Kingdom of Judah, was the seat of its worship, which included child sacrifice, particularly that of the first-born. Victims were killed, then burned. It is probable that this rite was a last desperate resort, used only in times of deepest distress.

**Molt'ke, Helmuth Karl Bernhard,** COUNT VON (1800-1891) a German field marshal. In 1819 he became lieutenant in the Danish army, but left to enter the Prussian service when Denmark and Norway were separated. In 1832 he was appointed to the staff and studied three years at Berlin. He was chief of the general staff in Berlin from 1858 to 1888, and he accomplished the great task of reorganizing the Prussian army. The three successful wars, upon which Germany now engaged against Denmark, Austria and France, were conducted by him, and their success was largely due to his military genius. Von Moltke was thoroughly prepared for the war with France, as he had made ready for the invasion of the country as soon as the war with Austria was over. He was made a count when the news of the surrender of Metz reached the King, and he had many other honors showered upon him, the most pleasing being the celebration of his 90th birthday as a holiday in all parts of Germany. He was modest and simple in character. His military tactics combined boldness of design and extreme carefulness in planning the details of his operations.

**Moluccas,** *Mo luk' az,* or **Spice Islands,** a group of islands of the Malay, or East Indian, Archipelago and made up of many small islands lying between Celebes and Papua. They are almost entirely of volcanic origin and are very fertile; their great production of spices is responsible for their common name. Rice, indigo, coffee, tobacco, fruits and valuable woods are also produced and exported. The pearl fisheries are extensive and give occupation to many of the inhabitants. The Moluccas have been claimed by the Spanish, the Portuguese and the Dutch, and are now chiefly owned by the last named. The inhabit-

ants are Papuans, Malays, Chinese, Japanese and a few Europeans. Population, 430,850.

**Momen'tum,** the quantity of motion possessed by a moving body. It equals the product of the mass of the body by its velocity. A ball weighing three pounds and moving with a velocity of five feet per second would have a momentum of $3 \times 5$, or 15, pounds feet per second, the unit of momentum in the English system being the momentum of a body of mass one pound moving with a velocity of one foot per second. The expression *pounds feet per second* is written after the numerical value 15 to show that in getting this value the mass of the body was expressed in pounds and the velocity of the body was expressed in feet per second. In the metric system the unit is the momentum possessed by a body of mass one gram moving with a velocity of one centimeter per second. See MOTION, LAWS OF; FORCE.

**Mommsen,** *Mom' zen,* **Theodor** (1817-1903), a German scholar and historian, born at Garding, in Schleswig, Prussia. He studied law and language at the University of Kiel from 1838 to 1843, and in 1844 accepted a commission to France and Italy for the purpose of collating manuscripts and inscriptions, returning three years later. He was made professor of Roman law at Leipsic in 1848. In 1852 he accepted the chair of Roman law at Zürich, going to a similar position at Breslau two years later. In 1858 he became professor of ancient history in the University of Berlin, holding this position until his death. Mommsen was perpetual secretary of the Berlin Academy and member of the Prussian Parliament. He was one of the greatest scholars of his time and the author of many works of great value. Chief among these is his *Roman History,* which is accepted as standard authority by the historians of the world.

**Monaco,** *Mon' a ko,* an independent Italian principality and the smallest sovereign state of Europe. With an area of about eight square miles, it lies between the Mediterranean Sea and the French Department of Alpes-Maritimes. It consists chiefly of the capital of Monaco, together with Monte Carlo and the village of Condamine. The scenery of the mountainous region is very picturesque. The inhabitants depend but little on commerce and industry, but make a living by providing accommodations for tourists. The town of Monaco is midway between Nice and Mentone and contains the palace of the prince, with an attractive garden, the cathedral in Romano-Byzantine architecture and the oceanographical museum.

Over a mile to the northeast is the famous town of Monte Carlo with its celebrated Casino, whose gaming tables are patronized by tourists from all over the world. Access to the gambling tables is denied the natives of the Principality of Monaco. The inhabitants of the whole principality are exempt from taxation, the rents of the Casino furnishing sufficient revenue. Population of the principality, 15,180.

**Monasticism,** *Mo nas' ti cizm,* or **Monachism,** *Mon' a kizm,* a system under which men and women renounce the worldly life and live in a house of retreat, devoting themselves to religious meditation and deeds of piety. Such places of retreats are known as monasteries and convents; their occupants, as monks and nuns. The term *friar* in its strict application refers to the members of those orders forbidden to acquire landed property and required to live by alms, as the Franciscans, Dominicans, Carmelites and Angustinians. The three vows of monasticism are poverty, chastity and obedience.

We find various forms of monasticism before the time of Christ; it was a feature of Brahmanism, was instituted by Buddha and favored by Confucius. The worship of Serapis in Egypt was connected with the establishment of monasteries, while the Nazarites of the Hebrews were in a sense a monastic order. The first Christian hermits settled on the shores of the Red Sea, and in time Upper Egypt harbored many Christians fleeing from persecution or seeking refuge from

the evil surroundings of the Roman Empire of the third century. St. Antony was the first to collect these scattered hermits and is regarded as the founder of Christian monasteries. Pachomius, about 340, founded a monastery on the Island of Tabennæ, in the Nile, and drew up the first definite rules for monastic living of which we have record. He also founded other monasteries, including one for women. St. Basil, about the same time, founded monasteries in Pontus and Cappadocia, earning the title of Father of Monasticism in the East. In the West, St. Benedict was the patriarch of monks. About 529 he founded the Monastery of Monte Cassino, which became the mother house of monasticism in the West, while the rule which he instituted had wide influence.

During the next few centuries monasteries multiplied and assumed great importance, becoming the centers of learning. The monks were teachers, missionaries and agriculturists combined, and they also rendered effective service to civilization by preserving classic and medieval manuscript literature. Among the important orders for men founded during the Middle Ages were the Congregation of Cluny, the Cistercians, the Carthusians, the Franciscans and the Dominicans. In the 12th century there also developed a number of military orders, such as the Knights Hospitalers and the Knights Templars. The members of these orders pledged themselves to make war on the infidels, in addition to taking the usual vows. The great Order of Jesuits originated at the time of the Reformation; their object at first was to bring back to the Catholic fold those who had been won over to Protestantism. Monasticism in modern times received a check in France, but has had a wide extension in the United States, where there are over 8000 men in religious orders, and about 45,000 women. See Benedictines; Dominicans; Franciscans; Jesuits; Lazarists; Paulists.

**Moncton,** *Munk' tun,* the second largest city of the Province of New Brunswick, Canada, 89 m. n.e. of St. John. It has a fine harbor on the Petitcodiac River, and the tide from the Bay of Fundy rises to the city, causing the phenomenon known as the tidal bore. It is on the Intercolonial and the Grand Trunk Pacific railways, and has railway shops, lumber, woolen and cotton mills and manufactories of woodenware, stoves, etc. Population in 1911, 11,345.

**Mon'day,** the second day of the week. Among the ancients the second day of the week was sacred to the moon, and the name Monday comes from the Old English word for moon.

**Mones'sen, Pa.,** a city of Westmoreland Co., about 2 m. from Charleroi and 42 m. s.e. of Pittsburgh, on the Pittsburgh & Lake Erie Railroad. Bituminous coal and iron are found in the vicinity. The growth of the town has been rapid within the last few years. Monessen has steelworks, foundries and an extensive wire-fence manufactory. Population in 1910, 11,775.

**Monet,** *Mo" neh',* **Claude** (1840- ), a French landscape painter of the Impressionist School. He recognized no master, but studied directly from nature, working in the open air and aiming to portray the fugitive effects of light and atmosphere and to reproduce an instantaneous impression of things. The juxtaposition of complementary colors in his canvases is sometimes startling, but the success of his undertaking is beyond question. Particularly strong are *The Orchard; Snow at Port Villers; On Cape Martin, Near Mentone;* and a series of cathedrals and views of London.

**Money,** *Mun' y,* a term used to designate the medium of exchange and the measure and standard of value. Whatever fulfills these functions, however crudely, is money.

Functions. In primitive conditions exchange of commodities was effected by means of barter: corn was traded for clothing. But it is easy to see that as the population of the community grew, and the conditions of life became more complex and industry more specialized, this method would be increasingly difficult. Suppose the man who made clothing did

not want more corn, but wanted an axe. The farmer who wanted clothing for his corn would have to find an axe maker who wanted corn and effect an exchange with him; then trade the axe for clothing. If all three, however, knew of some common article, such as tobacco, for instance, in terms of which they could express the value of corn, clothing and axes, it would be easy to negotiate exchanges of these goods. Certain articles of universal need or recognized value thus came to be used as means of exchange; such as shells, clothing, corn, salt, wampum, cattle, furs, hides. Gradually those articles that were most convenient and durable would be chosen for this purpose. So the metals came to be used as money; and as the result of further experience, these were practically narrowed down to the precious metals as best adapted to all. Thus money developed its primary function, that of a *medium of exchange.*

But if money is to fulfill that function satisfactorily, we must know how much other commodities are worth in terms of this article. Money thus becomes also a *measure of value.* This is what we mean by prices; that is, goods are worth such and such an amount as measured by money. The enormous importance of this function of money will be recognized at once without discussion. Modern commerce and civilization would be impossible without it. There is a still further function of money, closely akin to this. Many transactions are made involving the future: a note payable five years hence; a lease running for 10 years, 20 years, 99 years. It would work great injustice for the man who assumes such an obligation today to pay twice its value or half its value at maturity because of fluctuations in the medium of payment. A *standard of value* is therefore essential, for the sake of permanency and stability. Money fulfills this function also, making possible the storing up and measuring of wealth for the future.

Varieties. The choice of gold and silver as money was due to the fact that they best embody the qualities requisite for that purpose; namely, intrinsic usefulness or value; the greatest amount of value in the smallest bulk and weight; divisibility, so that both smaller and larger coins may be provided (a quality of gold, but not of diamonds, for instance); uniformity, so that one unit shall be like all the others in value (not the case with fur-currency or cattle-currency); durability of material; and stability of value. These same reasons have gradually led to the adoption of gold alone as the standard in most of the important commercial nations. This was accomplished in the United States by act of Congress on March 14, 1900. In some countries, however, both gold and silver constitute the standard (See Bimetallism); and even in those countries that maintain a gold standard, silver coins are used, having a value determined in terms of gold (See Dollar), so that both are the basis of the currency, although only one is technically the standard.

There are two main kinds of money. *Standard* or *intrinsic* money is that which is intrinsically worth its face value, or practically so. Sometimes a small amount of alloy is used for the sake of greater hardness and durability; as in United States silver dollars and gold coins, which contain ten per cent copper, and are designated as .900 fine. The other kind of money is *token* or *representative* money, which is not worth its face value, but merely represents that value in various forms. Such money in the United States constitutes the subsidiary coinage of silver 50-cent, 25-cent and 10-cent pieces; the minor coinage of nickels and pennies; and the several kinds of paper money. *Fiat* money is representative money which is made legal tender by action of the government without promise of redemption in gold or silver (See Fiat Money). In the more highly civilized nations representative money has come to be of great importance.

Coinage. Both silver and gold came into use as money in very early times, certainly as early as 1800 B. C., silver being first so used. But for many centuries

the metals passed by weight, as the shekel and talent among the Hebrews; and the names of many coins today are still the names of weights, as drachma, lira, pound. The difficulty of weighing money on the scales, however, was a great inconvenience; and a distinct advance in commerce was made when the pieces of money began to be stamped to indicate their weight and purity. This improvement was introduced by the Greeks about 900 B. C., and passed from them to the Romans. From the first the coining of money seems to have been recognized as a function of government, rather than of individuals, in order to secure uniformity and reliability. In the latter respect, however, unscrupulous rulers have often taken advantage of their prerogative by debasing the coinage.

In the United States the coinage now includes the following: The *standard* coinage consists of the $2.50, $5, $10, $20 gold coins, .900 fine; and the silver dollar, weighing 412.5 grains in silver, .900 fine, equivalent to a gold dollar of 25.8 grains, .900 fine, or 23.25 grains of pure gold, which is the standard. The *token* or *representative* coinage includes the subsidiary silver coins, half dollars, quarter dollars and dimes, which contain 385.8 grains to the dollar, .900 fine; 5-cent pieces weighing 77.16 grains, 75 per cent of which is copper and 25 per cent nickel; and pennies, weighing 48 grains, of which 95 per cent is copper and 5 per cent tin and zinc. The subsidiary silver coins are legal tender to the amount of $10, and the nickels and pennies to the amount of 25 cents. These coins are *fiat* money to the extent of the difference between their intrinsic value and their face value. See MINT.

PAPER MONEY. In addition to the coinage many countries have also paper money. This is wholly *token or representative* in character. It has practically no intrinsic value, but is used for the sake of convenience or to economize the precious metals, and its value depends wholly upon what it represents. In the United States this class of money includes gold certificates, silver certificates, United States notes, treasury notes and national bank notes. Gold certificates are issued by the government to represent gold of equal amount held in the United States Treasury for their redemption. Silver certificates, likewise, are issued by the government to represent coined silver dollars of equal amount held in the treasury. The United States notes, popularly known as *greenbacks* (from the fact that their backs are printed in green ink), are legal-tender notes, first issued by the government during the exigencies of the Civil War. They reached their maximum amount of $449,338,902 in 1864, during which year they were worth on an average about 45 cents on the dollar. These notes were *fiat* money pure and simple, until the Gold Standard Bill of 1900 pledged the credit of the United States for their redemption in gold, and directed the treasury department to set aside a gold reserve of $150,000,000 for this purpose. The United States treasury notes of 1890 were issued in payment for silver bullion bought for coinage, and are being retired as fast as the bullion is coined into dollars. National bank notes are issued by national banks to the extent of the par value of United States bonds deposited by them as security in the national treasury; except that five per cent of the total issue must be left with the treasurer for the redemption of worn-out bills. These bonds may be deposited to the amount of the bank's capital, if so desired. See CONTINENTAL MONEY.

CREDIT MONEY. It would be very inconvenient to conduct all commercial transactions by the actual payment of cash, and would require an enormous bulk of money. The custom has arisen, therefore, of depositing the money in a bank, and drawing checks, drafts or bills of exchange against it and sending these in payment of bills. Such paper may be regarded as a kind of representative money or as the representative substitute for money. Its use depends wholly upon credit. It has not inaptly been termed credit money. The vast majority of commercial transactions are so conducted, to

the estimated extent of 97 per cent of international commerce and 92 per cent of the commerce of the United States. See CREDIT.

FOREIGN MONETARY UNITS. The monetary units of various foreign countries, with their respective values, in United States money are as follows:

| COUNTRY | STANDARD | VALUE |
|---|---|---|
| Argentina | peso | $ .965 |
| Austria-Hungary | crown | .203 |
| Belgium | franc | .193 |
| Bolivia | boliviano | .389 |
| Brazil | milreis | .546 |
| British Honduras | dollar | 1.000 |
| Canada | dollar | 1.000 |
| Chile | peso | .365 |
| China | liang or tael | .574 to .640 |
| Columbia | dollar | 1.000 |
| Costa Rica | colon | .465 |
| Denmark | crown | .268 |
| Ecuador | sucre | .487 |
| Egypt | pound | 4.943 |
| England | pound sterling | 4.8665 |
| France | franc | .193 |
| Germany | mark | .238 |
| Greece | drachma | .193 |
| Guatemala | peso | .383 |
| Haiti | gourde | .965 |
| Honduras | peso | .383 |
| India | pound sterling | 4.8665 |
| | rupee | .324 |
| Italy | lira | .193 |
| Japan | yen | .498 |
| Mexico | dollar | .498 |
| Netherlands | guilder or florin | .402 |
| Newfoundland | dollar | 1.014 |
| Nicaragua | peso | .383 |
| Norway | crown | .268 |
| Panama | balboa | 1.000 |
| Peru | libra | 4.8665 |
| Philippines | peso | .500 |
| Portugal | milreis | 1.080 |
| Russia | ruble | .515 |
| Salvador | peso | .383 |
| Spain | peseta | .193 |
| Sweden | crown | .268 |
| Switzerland | franc | .193 |
| Turkey | piaster | .044 |
| United States | dollar | 1.000 |
| Uruguay | peso | 1.034 |
| Venezuela | bolivar | .193 |

See BANKS AND BANKING; BILL OF EXCHANGE; CHECK; TENDER, LEGAL; GRESHAM'S LAW; CURRENCY.

MONEY IN CIRCULATION. The amount and kinds of money in circulation in the United States on Oct. 2, 1911, exclusive of that held in the United States Treasury as government assets, to the amount of $356,132,331, was as follows:

| | |
|---|---|
| Gold Coin | $595,134,459 |
| Gold Certificates | 930,126,029 |
| Silver Dollars | 73,585,292 |
| Silver Certificates | 458,440,317 |
| Subsidiary Silver | 143,266,733 |
| United States Notes | 341,754,732 |
| Treasury Notes of 1890 | 3,155,749 |
| National Bank Notes | 696,719,404 |
| Total | $3,242,182,715 |

This gives a per capita circulation of $34.35.

**Money, Hernando de Soto** (1839-1912), a United States senator, born in Holmes County, Miss. He was educated at the University of Mississippi, studied law and became a planter. Money entered the army of the Confederacy at the beginning of the Civil War and served until discharged in 1864. He was a member of the House of Representatives from 1875 to 1885 and again from 1893 to 1897; and a member of the Senate from 1897 to 1911, being appointed to fill a vacancy in 1897, and was elected in 1899 and again in 1905.

**Money Order,** an order purchasable at one post office and payable at the same, or another, post office. The purchaser deposits the amount of the order desired, and pays a fee of from 3 to 30 cents for the service performed if payment is to be made in the United States. For orders payable in a foreign country, the fee is from ten cents to one dollar. No order for more than $100 is sold. The person to whom an order has been made payable may transfer it, but for payment it must be presented at the office specified, and only one indorsement is allowed. In the United States the postal money order system was adopted in 1864; in England somewhat earlier. Money orders payable in almost any country in the world are now obtainable at any of the larger, and many of the smaller, post offices. Express companies, with agents in almost every part of the world, transfer annually by money orders sums which, in the aggregate, are enormous.

**Mongo'lia,** a vast dependency of the Chinese Republic bounded upon the n. and w. by Siberia, on the e. by Manchuria and on the s. and s.w. by China and Chinese Turkestan. Physically it is surrounded by the great mountain ranges of the Altai, the Khangai, the Sayan and the Khingan, the last of which now lie wholly within Manchuria. It is, in general, a lofty desert region 2500 to about 3000 ft. in height and partly including the Desert of Gobi. In a few isolated sections millet and barley are raised, and cattle are herded by the nomadic desert tribes. In the north there are large forests, rapid rivers and a few lakes. The Mongolians are chiefly Buddhists and are proud of their ancient race and its former glories. In 1910 Mongolia declared its independence from China, but was unable to maintain its declaration. Population, 2,600,000.

**Mon'gols,** a people who in the 12th century dwelt in and about Mongolia, from whom that region received its name. Under their ruler Genghis Khan (1162-1227) they made extensive conquests in northern Asia, invaded Russia and entered and conquered Hungary and Poland. Their conquests and raids were characterized by great cruelty. At the death of Genghis Khan his great empire was divided among his sons. The seat of the great khan was removed to China, and under Kublai Khan, who became great khan in 1259, the empire was divided into four parts. The first, including China, Korea, Manchuria and Tibet, with its capital at Peking, was ruled by the great khan. The second part included the Middle Tartar Empire. The third part held sway over western Asia and a good part of Russia until 1480, when Russia overthrew the Mongol rule. The fourth part included Persia, Georgia and a part of Asia Minor. It was through the rulers of this division that trade connections were made with European nations.

The rise of Buddhism and Mohammedanism weakened the power of the Mongols. In 1368 their rule in China was overthrown by a revolution, which placed the Ming dynasty in power; they divided into small tribes which went northward and were finally conquered by the Manchus. Scattered tribes of Mongols are still found in Asia. See KUBLAI KHAN; TIMUR.

**Mon'goose,** See ICHNEUMON.

**Monitor, The,** a famous ironclad, built at the Brooklyn shipyard, between October, 1861, and January, 1862, under the direction of the Swedish inventor, John Ericsson. It was 172 ft. long and carried two 11-inch guns in a revolving turret, which was 20 ft. in diameter and 9 ft. high. This 900-ton vessel looked like "a cheese box on a raft." Immediately upon being launched, the *Monitor* was taken to Hampton Roads, Va., by Lieutenant Worden, where, on March 9, she met the Confederate ironclad, *Merrimac*. A terrific contest ensued, but after four hours no lives had been lost and the vessels withdrew from the undecisive encounter. This was the first contest between ironclads which the world had ever seen, and it revolutionized naval warfare. The name *Monitor* was given to boats subsequently built after plans of the first *Monitor*. In December, 1862, the *Monitor* was wrecked off Cape Hatteras. See HAMPTON ROADS, BATTLE OF.

**Monk, Frederick de Bartzch** (1856- ), a Canadian statesman, born in Montreal and educated at McGill University. He has long been a leader of the Montreal bar and in 1892 became professor of constitutional and international law at Laval University. In 1896 he entered the House of Commons, from 1900 to 1904 he led the Liberal-Conservative Party in his province, and in October, 1911, he was sworn to the Privy Council and became minister of public works in the Borden cabinet.

**Monk, George,** FIRST DUKE OF ALBEMARLE (1608-1670), an English general, born at Potheridge, Devonshire. He began his military career in Spain, where he distinguished himself. Later he was connected with the Dutch forces. He was also prominent in Irish and Scotch affairs. In 1660 he led 6000 men into London, called together the members of

Parliament who were expelled in 1648, secured a majority in favor of the dethroned Charles II, and caused him to be declared king, thus restoring the Stuart dynasty. For this service Monk was made Duke of Albemarle, privy councilor, chamberlain and lord lieutenant of Devon and Middlesex. He was also a famous sea fighter, winning victories over Admiral Tromp, and, later, over De Ruyter.

**Monkey,** *Mung' ky,* a general term technically applied to all members of the Primate order except man, lemurs and baboons; in its narrowest sense it excludes the apes, which are the larger Primates of the Simian Family. Popularly the term *monkey* refers to the long-tailed species which have short, narrow faces and are, in general, inferior in size to others of the order.

Those of the Old World belong to one of two classes: the small, active long-tailed monkeys which are of rather high intelligence; and the larger, shorter-tailed monkeys, which have cheek pouches for storing food. Members of both classes are comical little fellows, with quizzical faces and curious ways. They live in trees and generally move about in great herds, chattering, laughing and quarreling among themselves like a band of children. Some are beautifully marked and have silky, white, black or yellow hair, but the majority are brown or gray. They are found in Southern Asia or central and northern Africa. To this group belong the queer nose-monkey of Borneo, the quereza and the yellow rhesus, or Bengal monkey.

The New World monkeys are narrow-nostriled and of a type inferior to their Old World relatives. There are two families, the Marmoset and the Cebus. All are small, hairy creatures, some scarcely bigger than kittens, and they have long, prehensile tails that curl readily. Their home is the South American forest, where they climb with great agility and feed upon the fruits and nuts that abound. The most familiar of these are the capuchins, whose solemn face with stiff hair, standing over the forehead like a cowl, has given them their name. These are especially noted for their long leaps from the tops of tall trees to the lower branches, where they cling with legs and tail just long enough to break the fall, and then are off again. They travel in herds and seem to be led by a patriarch of the tribe who directs the line of march. Most of the organ grinders' monkeys are of this class, as they make interesting and amusing pets. The spider monkeys, howlers, woolly monkeys, sakis and squirrel monkeys belong to the same class. See Howler; Marmoset.

**Monkey-Bread Tree.** See Baobab.

**Monmouth,** *Mon' muth,* Ill., a city and county seat of Warren Co., 28 m. n.e. of Burlington, Iowa, and about 95 m. n.w. of Springfield, on the Chicago, Burlington & Quincy, the Iowa Central and other railroads. The town has a large trade in grain, live stock and produce, and is engaged in farming, horse breeding and coal mining. Among the manufactured products are farming implements, pottery, stoneware, sewer pipe, boxes, cigars and soap. Monmouth College (United Presbyterian) is located here. Monmouth was settled in 1836 and first incorporated in 1852. Population in 1910, 9128.

**Monmouth, Battle of,** a battle of the Revolutionary War, the last to occur in the North, fought at Monmouth, N. J., June 28, 1778. Washington commanded the Americans; Clinton, the British. Each had about 15,000 men. As part of the engagement, Gen. Charles Lee with 6000 men was to crush the left wing of the British army, which comprised some 8000 troops under Cornwallis. To the astonishment of both armies, Lee ordered a retreat shortly after the fight began, and only the timely arrival of Washington, whom Lafayette summoned, prevented a rout (See Lee, Charles). With much difficulty Washington reformed Lee's broken lines and ordered a general attack. Each side lost about 400 men. Washington considered the battle a defeat; but Clinton continued on his retreat to New York.

**Mon"omet'allism.** See BIMETALLISM.

**Monon"gahe'la River.** See OHIO RIVER.

**Monop'oly.** See TRUSTS.

**Mon'orail",** an elevated railway, on which the cars are suspended from the single rail on which they run. The rail is supported by steel trusses. A railway of this pattern is in successful operation in Berlin, and several points are claimed in its favor. It can be operated with less power; it can turn sharper curves; and there is less danger of derailing the cars than in the old system. Several attempts have been made to operate surface cars on a monorail, the car being kept in an upright position by a large gyroscope (See GYROSCOPE), but they have not been practicable.

**Mon'otype.** See TYPESETTING MACHINE, subhead *The Monotype.*

**Monroe,** *Mun ro',* **James** (1758-1831), fifth president of the United States, born in Westmoreland County, Va. His ancestors were of Scottish origin and came to Virginia as early as 1650. He entered William and Mary College, but his course was interrupted by the Revolutionary War, in which he served, being present in several important battles and attaining the rank of lieutenant-colonel. After the war he studied law under the direction of Thomas Jefferson, to whom he owed much throughout his life in the way of friendship and preferment.

In 1782 Monroe was elected to the Virginia Legislature, and from 1783 to 1786 he served in the Continental Congress, where he was a popular and influential member. He was again elected to the State Legislature in 1786. In 1788 he opposed the ratification of the Federal Constitution in the Virginia convention, on the ground that it conferred too much authority upon the central government. He became United States senator in 1790, serving until 1794 as a prominent Anti-Federalist and opponent of Washington's administration. In the latter year he was appointed minister to France, but was recalled two years later because of public utterances which Washington regarded as indiscreet. His recall occasioned bitter party feeling, and he wrote a defense of his conduct.

From 1799 to 1802 Monroe was governor of Virginia. He was sent back to France in 1802 as special envoy to assist our minister there, Robert R. Livingston, in negotiating the purchase of Louisiana, which was accomplished in the spring of 1803. He then went to London as minister at the court of St. James, where he remained until 1807. Returning home, he was again elected to the Virginia Legislature, and became governor once more in 1811. He resigned the same year, however, to become Madison's secretary of state, and served in this capacity for six years, including the entire period of the War of 1812.

In 1817 Monroe succeeded Madison as president of the United States, and four years later was reelected for a second term, with only one electoral vote cast against him. As president he surrounded himself with the best statesmen of his time and dealt ably with public questions. The most notable events of his administration are the purchase of Florida from Spain in 1819, the Seminole War, the visit of Lafayette as the nation's guest, the recognition of the independence of Mexico and the South American republics, and the enunciation of the Monroe Doctrine. His administrations are known as the "Era of Good Feeling." See MONROE DOCTRINE.

**Monroe, La.,** a city and the parish seat of Ouachita Parish, 55 m. e. of Shreveport and about 155 m. n.w. of Baton Rouge, on the Ouachita River and on the St. Louis, Iron Mountain & Southern, the Queen & Crescent Route and other railroads. There is steamboat communication with several towns on the Ouachita River. The section in which it is located is highly productive agriculturally, and the cotton and lumber industries lead all the rest. In the lumber mills, cotton mills and compresses, cottonseed-oil mills, brickyards and woodenware factories the chief industrial interests are centered. There

is an important trade in cotton and lumber. The city has a handsome Federal Building. Population in 1910, 10,209.

**Monroe Doctrine,** the term applied to the policy of the United States regarding foreign interference in the affairs of any nation on the American continent. It was first distinctly expressed in President Monroe's message in 1823, from which fact it takes its name. It declares in substance that the United States is the paramount power in the Western Hemisphere and that it will regard any attempt on the part of a European power to gain a foothold by conquest or to acquire any new establishment on the American continent as an act hostile to the United States. The Monroe Doctrine applies only to territorial aggression by foreign powers and is based upon two passages in the message. The first referred to the boundary lines in the Northwest, then in dispute between Russia, Great Britain and the United States. The second related to the so-called Holy Alliance, consisting of Russia, Austria, Prussia and France, which aimed to interfere in America to restore to Spain the South American colonies that had gained their independence and been recognized by the United States.

The reality of this new factor in world diplomacy was proved at the close of the Civil War when the French had all but placed Maximilian upon the throne of Mexico. The invaders withdrew, at a signal from the United States, leaving Mexico under the government of its own people. Another event was the Venezuela episode of 1895, in connection with which the United States led Great Britain and Venezuela to refer their dispute to an arbitrator.

On Aug. 2, 1912, the United States Senate resolved: "That when any harbor or other place in the American continent is so situated that the occupation thereof for naval or military purposes might threaten the communications or the safety of the United States, this government could not see without grave concern the possession of such harbor by any corporation or association which has such a relation to another government, not American, as to give that government practical power of control for national purposes."

This action of the Senate grew out of the report that a stretch of territory bordering on Magdalena Bay, Mexico, might be acquired by a Japanese company.

**Monsoon',** a wind resulting from the unequal heating of extensive areas of contiguous bodies of land and water, and which changes regularly with the months or seasons. India and the southeastern part of Asia afford the best illustration of monsoon-swept land areas. During the hot season this vast territory becomes heated, while the temperature of the adjacent waters remains almost unchanged. Somewhere high above the surface along the line of junction of the warm air overlying the land and the cooler air of the sea, the latter begins to descend in an oblique course, displacing the lighter and warmer air. This warm air, after becoming cooled in high altitudes, finally falls by gravity, and the circulation is sustained throughout the season. In winter the movement of the air currents is reversed; the land, subject at all times to extremes of temperature, now becomes cooled to a point below the sea, and a surface outflow of air toward the ocean results. Regular seasonal changes in the direction of the wind similar to the Asiatic monsoon occur in Texas, Brazil, Europe, Africa and Australia. See LAND AND SEA BREEZES.

**Montagu,** *Mon' ta gu,* **Lady Mary Wortley** (1689-1762), an English writer, eldest daughter of Evelyn Pierrepont, later Duke of Kingston. In 1712 she married Mr. Edward Wortley Montagu, whom in 1716 she accompanied to Turkey in his official capacity of ambassador at Constantinople. She there wrote her famous *Turkish Letters.* Upon her return she quarreled with Pope, who, with Addison and Congreve, was among her intimate friends, and the

poet often attacked her in his writings. While in Turkey, Lady Montagu learned of inoculation for smallpox, and this practice was introduced into England largely through her efforts.

**Montaigne,** *Mon tane',* **Michel Eyquem de** (1533-1592), a distinguished French essayist, born in the Château Montaigne, in Périgord. In accordance with his father's ideas, he was taught and allowed to speak only Latin from earliest childhood. Having studied law at Bordeaux, he was Parliamentary counselor from 1557 to 1567, meanwhile serving as gentleman of the chamber to the king. In 1571 he retired to his ancestral estate, where he studied the various schools of Greek and Roman philosophy. Later he traveled through Germany, Switzerland and Italy, partly to escape the plague and partly for the improvement of his health, while in Rome being received with great honors by the Pope. After a last visit to Paris, he lived in retirement in his château. Montaigne's essays continue to be among the most popular of French books. Though not characterized by the reticence or delicacy now demanded, they are remarkable for their display of learning and sound reasoning and for the frankness with which they deal with social questions. Their ethics are those of the ancient philosophers. Translations of the essays exist in almost all European languages.

**Monta'na,** The Treasure State, one of the Mountain States, is bounded on the n. by Canada, on the e. by the Dakotas, on the s. by Wyoming and Idaho and on the w. by Idaho.

Size. The greatest length from east to west is 550 m. The average breadth from north to south is 275 m. and the area is 146,997 sq. m., of which 796 sq. m. are water. Montana is a little smaller than Colorado and Pennsylvania combined, more than twice the size of North Dakota and the third state in area.

Population. In 1910 the population was 376,053. From 1900 to 1910 there was a gain in population of 132,724, or 54.5 per cent. There are 2.6 inhabitants to the square mile and the state's rank in population is 40.

Surface. The eastern part of the state belongs to the Great Plains region and consists of a rolling plateau varying in altitude from 2000 ft. in the northeast corner of the state to 4000 ft. where it curves westward and meets the foothills of the Rocky Mountains. The rivers have worn deep channels in the surface and here and there isolated hills and peaks appear. In many places the cliffs have been marvelously sculptured by wind and water. In the northern part of the state the plateau extends westward beyond the 113th meridian until it meets the Main Range of the Rocky Mountains. But in the central and the southern parts ranges of low mountains are reached a little east of the central part of the state. Little Belt and Big Belt mountains extending nearly in a northeast and southwest direction east of the Missouri River are the most prominent of those ranges in the central part of the state. Further south are the Crazy Mountains, the first range that one meets in going westward over the Northern Pacific Railway.

The Main Range of the Rocky Mountains enters the state about 100 m. east of its western boundary and extends across it in a southeast direction. This is the most important range in the mountain section. It forms the southern boundary between Montana and Idaho, a branch of the Bitter Root Mountains forming the western boundary. The entire mountain region, which covers over 40,000 sq. m., is crossed by ranges extending from the northwest to the southeast, and separated by intervening valleys. These valleys are intersected by cross ranges forming cross valleys and glens, so that the surface of the region is very complex. Some of the most important mountain ranges of the state are the Main Range of the Rocky Mountains, sometimes called the continental divide, Bitter Root, Kootenai, Big Belt, Gallatin, Madison, Cœur d'Alene, Mission and Beartooth. Among the highest peaks in the state are Electric Peak,

11,155 ft., Mt. Powell, 12,000 ft., and Gallatin Peak, 10,967 ft. The sides of most of these mountains are heavily timbered, while many of the valleys are fertile. Above the timber line are Alpine growths which are valuable in conserving moisture. The summits of many of the peaks are crowned with perpetual snow and on the highest of them permanent glaciers are found. Much of this region is comparatively unknown except to the trapper and mountaineer, and it contains a wealth of scenery remarkable for its beauty and grandeur. When the construction of railroads makes the region more accessible it will doubtless be thronged with visitors from all parts of the country.

Rivers and Lakes. The Main Range of the Rocky Mountains forms a divide separating the rivers flowing into the Pacific Ocean from those flowing into the Mississippi River. On the westward slope, across the Rockies, are the Kootenai and Clark Fork rivers, tributaries of the Columbia. Just east of their drainage basin is the St. Mary's River, a tributary of the Saskatchewan, which flows into Hudson Bay. With these exceptions the entire state is drained into the Missouri, which is the most important stream. It is formed by a union of the Jefferson, the Gallatin and the Madison, a little north of Yellowstone Park, and flows northward, then eastward, across the state. Its most important tributaries from the north are the Marais and the Milk, and from the south, the Musselshell and the Yellowstone. The important tributaries of the Yellowstone are the Big Horn, the Tongue and the Powder, each rising in Wyoming. Some of the mountain streams have an exceedingly rapid descent, and, being fed by mountain snows, their waters afford unfailing motive power and unexcelled facilities for irrigation. Flathead Lake, in the northwestern part of the state, is the only large lake within its borders, but there are many small lakes among the mountains noted for their great depth and made attractive by the clearness of their waters.

Climate. Owing to its variety of surface Montana has a varied climate. The heaviest rainfall, from 18 to 20 inches annually, is in the northwestern part of the state and a portion of the mountain regions, as parts of Gallatin Valley and Judith Basin. Most of the rainfall occurs in the spring and early summer, when it is most needed for the growing crops and native grasses. The average rainfall for the entire state is 15 inches. Montana lies between the 45th and 49th parallels of north latitude, so that the state lies in the temperate zone. In this zone the summers are generally short and hot and the winters long and cold, but in Montana the climate is more equable. The elevation of the land tempers the summer heat, and the chinook winds (See Chinook) moderate the winter cold. These winds come from the Pacific Ocean and lose their moisture as snow or rain on the western slope of the mountains. On the eastern slope they have become dry and warmer and are typical Montana chinooks, causing sudden rises in temperature. In most places irrigation is advantageous and in many places it is essential.

Minerals and Mining. Montana has been known chiefly as a mining state. Ever since the pioneer days when gold was discovered in 1862, mining has been one of the chief industries, the principal metal products being copper, silver, gold, zinc and lead. Gold was at first the leading mineral, next silver, but for a number of years the copper output has outstripped that of both gold and silver. Montana shares with Arizona the first place of copper production in the United States. The modern way of mining is to use a dredge boat which does it own digging and washing, the power being supplied by electric plants located on some mountain stream. The largest copper mine is at Butte, the largest city in the state and the seat of the greatest mining camp in the world. The immense smelters where the Butte ores are reduced are at Anaconda and Great Falls. The most important copper mines are in Silver Bow, Broadwater, Jeffer-

son and Beaverhead counties. Gold is chiefly found in Deer Lodge and Madison counties, and the famous "Last Chance Gulch" is located in the southern part of Lewis and Clark County. Large quantities of silver and gold are also obtained from the copper ore. Lead and zinc are found in many of the counties in the mountain sections. Montana is rich in coal deposits. More or less workable fields have been found in 28 counties.

The coal underlying the eastern portion of the state is lignitic and of inferior quality, but that in the mountain districts is bituminous, which is of more recent origin than lignite. The principal coal mines of the state are at Red Lodge, Stockett, Belt, Bridger and Roundup. These coal formations occur near the surface and cover an area of thousands of square miles. Granite, sandstone and limestone are abundant in southern Montana. At Columbus is a sandstone from which excellent grindstones are made. Gypsum mines are in operation in Carbon and Cascade counties. Sapphires are found along the Missouri River in Powell and Granite counties, and the mines on Yogo Creek in Fergus County are considered the most valuable in the world.

Forests and Lumber. About one-fourth of Montana is forested. There are extensive forests of yellow and white pine, Douglas spruce, fir and tamarack among the mountains, and cottonwood and willow grow along the streams in the plains. In the arid region stunted red cedars are found along the water courses. The United States Government has set apart large sections of the forest area for national forests, the total amounting to 20,000,000 acres and taking in parts of 25 counties. Among these natural forests is Glacier National Park, embracing about 14,000 sq. m. in Flathead and Teton counties (See Glacier National Park).

Notwithstanding the large amount of timber, lumbering is not yet an important industry. This is owing in part to the predominance of the mining industry and in part to the fact that demands for lumber outside of the state can at present be supplied more economically from the lumber regions in Washington, Minnesota and the Southern States.

Agriculture. The eastern part of the state is excellent grazing land, and raising live stock is the chief branch of agriculture in this part of the state. In sheep raising Montana leads the United States, the conditions being favorable to the production of the best sheep and of high-grade wools. Horses and cattle are also raised in large numbers. The United States army maintains one of its remount stations at Miles City, which is one of the greatest primary horse markets in the country. The breeds of cattle are also constantly improving.

The soil is generally fertile and good crops are raised in many localities without irrigation. Where irrigation is possible the yield is greatly increased. There are numerous irrigation projects in all sections of the state, some conducted by private corporations and others in charge of the United States Government. When all of these are completed something like 2,000,000 acres will be supplied with water (See Irrigation). Oats, hay and alfalfa are the leading field crops, followed in the order of value by wheat, barley, rye and potatoes, flax, apples and sugar beets. The flax-raising and sugar-beet industries are rapidly growing. Fruit raising is largely carried on in the Bitter Root, Kootenai and Flathead valleys. The apples raised in these valleys are of excellent quality. Dry-farming is largely in use. It is practiced where moisture is not sufficient to produce good crops under ordinary methods of cultivation.

Manufactures. The production of flour and gristmill products and the manufacture of beet sugar and lumber products constitute the leading manufacturing industries. In the large mining centers there are shops for repairing mining machinery and tools, and railway shops are located at division points on the various lines for repairing cars and loco-

motives. The great smelters at Anaconda and Great Falls are more closely associated with the mining than with the manufacturing industries. The state has large deposits of limestone suitable for the manufacture of Portland cement, and cement mills are in operation at Trident, near the three forks of the Missouri River. Clay products such as fire brick and tiles are made at Butte, Great Falls, Helena and other places.

Transportation and Commerce. The Great Northern Railway extends across the state from east to west. The Northern Pacific Railway follows the Valley of the Yellowstone as far as Livingston, then crosses the mountains by way of Butte and Helena and enters the Valley of the Clark Fork River, which it follows into Idaho. The Chicago, Milwaukee & Puget Sound line crosses the state from east to west a little south of the median line between the northern and southern boundaries. The Burlington has a line entering the state from Wyoming and extending to Billings and Great Falls. The Oregon Short Line extends from Idaho northward to Butte. Each of the trunk lines has a number of branch lines or feeders.

The commerce of the state is large in proportion to the population. Copper, gold and silver are exported in large quantities, and wool, grain and live stock constitute the chief agricultural exports. Manufactured goods, machinery and foodstuffs are imported.

Government. The constitution was adopted in 1889. Women can vote in all school elections and can hold any school office except that of state superintendent of public instruction. The executive department consists of a governor, lieutenant-governor, secretary of state, treasurer, auditor, attorney-general, railroad commissioners and superintendent of public instruction, all elected for four years. The Legislature consists of a Senate of 29 members and a House of Representatives of 73 members. Senators are elected for four years and representatives for two. Sessions are biennial and are limited to 60 days.



The judicial department comprises a Supreme Court of three judges elected for six years, and of District Courts consisting of one or more judges each elected for four years. The judicial districts are created by the Legislature as needed.

Education. Although one of the newer states, Montana has an excellent educational system, which provides for common schools throughout the state and county high schools wherever they are needed. Over half the counties have county high schools. There are also high schools in all the larger cities. The University of Montana is at Missoula. The state normal college is located at Dillon. The agricultural college is at Bozeman and the school of mines at Butte. The public schools are under general supervision of a state superintendent of public instruction and the schools of each county are under the direction of a county superintendent.

State Institutions. The schools for the deaf and blind and feeble-minded are at Boulder. There is a state orphans' home at Twin Bridges, a state soldiers' home at Columbia Falls and a state insane hospital at Warm Springs. The penitentiary is at Deer Lodge and the reformatory at Miles City.

Cities. The chief cities are Helena, the capital; Butte, Great Falls, Anaconda, Missoula, Bozeman, Billings, Livingston, Kalispell, Miles City, Lewistown, Dillon, Red Lodge and Havre.

History. Montana (mountainous) was visited first by the French in 1742. In 1805 Lewis and Clark explored this territory, the greater part of which was given to the United States through the Louisiana Purchase in 1803. In 1846 the American Fur Company built the first permanent settlement, Fort Benton. Following the rich discovery of gold, 1862, thousands flocked to Montana where, in Alder Gulch alone, the gold-dust yielded $25,000,000 in a few months. In 1864 Montana Territory was organized. On the Big Horn River in June, 1876, the Custer Massacre occurred. Since the era of railroads, Montana has

steadily prospered, and it became a state in 1889. Within the last few years, due partly to the completion of the Chicago, Milwaukee & Puget Sound Railroad, and to the opening of the Flathead Indian Reservation, thousands of new settlers have come into eastern Montana. Consult Bancroft's *The History of Washington, Idaho and Montana.*

GOVERNORS. Joseph Kemp Toole, 1889-1893; John Ezra Rickards, 1893-1897; Robert Burns Smith, 1897-1901; Joseph Kemp Toole, 1901-1909; Edwin L. Norris, 1909-1913; Samuel V. Stewart, 1913—. Most of these governors have served but one term.

**Montana, University of,** at Missoula (1895). In 1892 Congress granted 72 sections of land as an endowment for this university. It opened in 1895 and now maintains departments of literature, science and the arts, a school of engineering, a biological station and a summer school. Its endowment in 1910 was $900,000. The enrollment is about 250.

**Mont Blanc,** *Mon Blon*, a mountain peak, the highest in Europe outside of the Caucasus. It forms a part of the Western Alps and its highest point (15,781 ft.) is in France, 7 m. s. of the boundary of Switzerland and 40 m. s. of Lake Geneva. The mountain mass is about 30 m. long and 10 m. wide. It receives its name from its immense ice cap, over 75 ft. deep, the altitude of the line of perpetual snow being 8600 ft. above sea level. Down its sides hang the huge glaciers that feed the mountain streams below, especially the tributaries of the Rhine and the Po. The Glacier du Géant is the largest and it extends almost to the bottom of the Valley of Chamouni on the north. At its base it is called the Mer de Glace. The first successful ascent of the peak was made by Jacques Balmat, a mountain guide, in 1786, many persons having previously perished in the fatiguing attempt. Its summit is now visited by large numbers of tourists. There are two astronomical and meteorological observatories, one on its summit and the other 14,324 ft. up its slopes.

**Montcalm,** *Mont kahm'*, **Louis Joseph de Saint-Véran,** MARQUIS DE (1712-1759), a French general. He was born at Condiac near Nîmes, entered the army at 14 and became a captain at 18. He distinguished himself in several European campaigns, and in 1756 he became commander-in-chief of the French troops in Canada. In August of the same year he captured Ft. Ontario, at Oswego, in 1757 he forced Ft. William Henry, on Lake George, to capitulate, and in 1758 he successfully held Ticonderoga with 4000 men against a British force of 15,000 under Abercrombie, repulsing the latter July 8. Lack of troops and supplies forced Montcalm to go to Quebec, in 1759, which at once became the object of concentrated British attack. The celebrated siege of Quebec was begun by Wolfe July 31, 1759. After six weeks he led his men up a precipitous path to the Plains of Abraham, a plateau in the rear of the city, where the two armies met Sept. 13, the French being completed routed. Wolfe was killed in the engagement and Montcalm was mortally wounded, dying a day later, while the place was still held by the garrison. His last words were: "Thank God, I shall not live to see the surrender of Quebec!" He was buried beneath the floor of the Ursuline Convent in Quebec, which city, in 1827, erected a monument to the joint memory of Montcalm and Wolfe.

**Montclair', N. J.,** a city of Essex Co., 6 m. n.w. of Newark, on the Delaware, Lackawanna & Western Railroad and the Greenwood Lake Branch of the Erie Railroad. It is situated on the slope and at the base of the Orange Mountains, and its broad and shaded streets, rising one above another, afford beautiful views of New York City and its harbor. The city is the home of many New York and Newark business men. The upper portion was originally called Speertown when settled by the Hollanders from Hackensack, and the lower part was first called Cranetown, then West Bloomfield, by its English settlers from Newark. The present name was adopted

in 1865. The Montclair Military Academy, two orphan asylums and a hospital are located here. The industrial establishments include electric-construction works, large printing plants, etc. The city is noted for its healthful climate. Population in 1910, 21,550.

**Mon'te Carlo,** *Kahr' lo.* See MONACO, *Mon' a ko.*

**Montefiore,** *Mon" te fe o' re,* **Sir Moses Haim** (1784-1885), a Jewish philanthropist, born in Italy and educated in London. In 1824 he retired from the Stock Exchange and began crusading for the amelioration of his race. Having removed the civil disabilities of Jews in England, he became high sheriff of Kent and, in 1837, sheriff of London. The same year he was knighted, and in 1846 he became a baronet. In 1865 he endowed at Ramsgate a Jewish college to commemorate his wife. Sir Montefiore made seven journeys to the Orient in behalf of his people between 1827 and 1875, being everywhere honored.

**Montenegro,** *Mon te na' gro,* a small European kingdom of the Balkan Peninsula, bounded on the n. by Austria-Hungary, on the e. by Servia, on the s. by Albania and on the w. by Austria-Hungary and the Adriatic Sea. This tiny kingdom, whose area, 5300 sq. m., is more than that of Connecticut, has been preserved as an individual nationality because its mountain fastnesses are almost inaccessible to invading hosts, and its people are heroic in their resistance to an enemy. The mountains are of limestone formation and are cut by numerous streams and set with occasional lakes. Agriculture cannot be practiced to any extent because of the nature of the country, although potatoes, tobacco and some cereals are raised on small patches of cultivated land. Extensive forests cover the higher slopes of the mountains, and vineyards and olive groves lie nearer the sea. The inhabitants are either fishermen or herdsmen; Lake Skutari and the Adriatic are the source of supply of the fish, which are dried and salted in great numbers. Elsewhere great herds of cattle, sheep, goats and swine graze upon the hills. The mineral supply consists in iron alone.

The Montenegrins are a fearless, simple people of the Slavic race; sturdy honesty and loyalty seem bred in the free outdoor life with which they are familiar. The majority are, in their religion, Orthodox Greeks. The government is supposed to be a limited monarchy, but the king really possesses absolute power. Cetinje, or Cettinje, is the capital. Other towns of importance are Podgoritza, Dulcigno, Niksic' and Antivari. Montenegro has maintained its independence for centuries in spite of its smallness and its many greedy neighbors. Against the Turks especially, the Montenegrins have defended themselves, and in the recent Balkan War they united with the other Balkan states to drive the Turks out of Europe. The population of Montenegro is 500,000. See BALKAN WAR.

**Monterey,** *Mon" te ra',* **Battle of,** an important engagement of the Mexican War, fought in September, 1846, between 6700 Americans, under General Taylor, supported by generals Garland and Worth, and 10,000 Mexicans, under General Ampudia. After a bloody siege of three days, Worth forced the surrender of the chief stronghold of northern Mexico, which he occupied on Sept. 23. However, the honors with which the Mexicans were allowed to capitulate caused considerable dissatisfaction to the American officers.

**Montesquieu,** *Mon" tes ku',* **Charles de Secondat,** BARON DE LA BRÈDE ET DE (1689-1755), a French political and philosophical writer, born at the Château of Brède, near Bordeaux. He was a brilliant lawyer, and in 1714 was appointed a councilor of the Parlement of Bordeaux. His tastes were rather for travel and independent study than for the routine of official duty, and his writings soon revealed the fact that he was one of the clearest political thinkers of his day. His representative works are keen and analytical, systematic, but popular, and include *Reflections on the Causes of the Rise and Fall of the Ro-*

*man Empire* and *Spirit of the Laws,* the latter the work of 20 years and a classic in historical political science.

**Montessor'i Method,** an educational system which has grown out of the study and teaching of Madame Maria Montessori, a doctor and teacher of Rome. Dr. Montessori was in 1898 an assistant at the Psychiatric Clinic of the University of Rome; here she became interested in the work with feeble-minded children and began the study of the educational methods used with subnormal and idiot children. The treatment then in vogue for such children emphasized the medical side to such an extent that Dr. Montessori was led to disagree with her associates and to advocate a method in which the pedagogical side was more in evidence. A lecture which she delivered in exposition of her theory excited such widespread comment that she was called upon by the Italian minister of education to deliver a series of lectures to the teachers of Rome on the education of deficient children.

Following this, she became a director of the State Orthophrenic School, which had resulted from her lectures. Here, and in the Medical Pedagogic Institute, where subnormal children both from the asylums and from the public schools were brought, Dr. Montessori spent two years training teachers and observing the children uninterruptedly from eight in the morning until seven in the evening. When some of the feeble-minded children whom she had trained were able to pass the examinations required of normal children of the same age, instead of considering her own work marvelous, Madame Montessori used the result as proof that modern school methods were fallacious, and she at once set about applying the methods used in her school to public schools. This idea she does not claim to have originated; in fact it had been suggested by American educators, but she was certainly the first to put it into actual use. After some years of study Dr. Montessori's great opportunity came when she was asked to organize the infant schools of the model tenements built by the Roman Association of Good Building in the heart of the Roman slums.

The Casa dei Bambini, or Children's Houses, are in many ways like American kindergartens, except that they are located in the tenements or apartment houses and take in only those children living in the building. The Children's Houses have a directress, not a teacher, and her duty, as the name implies, is to direct and observe rather than to teach.

The chief difference between the kindergarten method and the Montessori method is that the one teaches collectively, the other individually. Dr. Montessori believes in the development of the child in the direction of its natural tendencies. To accomplish this she uses no fixed desks and seats but provides instead light tables and chairs which the children may lift from place to place. The children are at liberty to move about as freely as they choose as long as they do no harm; thus they play singly or in groups, as the fancy dictates, and express their own tendencies in their choice of plays. Children between the ages of three and seven are admitted and remain in the school at least from nine until four. In regard to discipline, Dr. Montessori says: "We do not consider an individual disciplined only when he has been rendered as artificially silent as a mute and as immovable as a paralytic. He is then an individual annihilated, not disciplined. We call an individual disciplined when he is master of himself." A child who habitually disturbs others without regard for correction is first examined by a physician; if he is found to be a normal child, he is placed by himself at one of the small tables in a corner of the room. Here he has a comfortable little chair, his favorite games and an excellent opportunity to watch his playmates and observe the advantages of sociability in play.

The lessons of the Montessori school are marked for their brevity, simplicity and truthfulness. The personality of the teacher entirely disappears and the ob-

ject of which she is speaking alone remains in evidence. The great object of the method is to find *spontaneous* activity and not to arouse unnatural effort by repeating the lesson or by correcting an error.

Dr. Montessori's method begins with the training of the senses. The touch is trained as carefully in these normal children as it is among the blind, and it becomes as useful a sense. To train it the directress has rough and smooth objects, letters cut from sandpaper, cylinders of varying weight and size and similar objects. These the children use with their eyes open or blindfolded. The chromatic sense, or sense of colors, is trained by means of tablets wound with colored silk, woolen balls and blocks of varying shades. The discrimination of sounds and the development of the other senses are as carefully looked after. The intellectual education begins naturally with the sense development, and the children learn reading and writing from the same sandpaper letters which they used in their early games. This, however, is a simpler process in Italian than it would be in English, where spelling is less phonetic. Manual labor, physical education, cleanliness, politeness, personal needs, such as buttoning and unbuttoning, lacing shoes and fastening hooks and eyes and automatic fasteners,—these are all parts of the Montessori curriculum. The material which is used has all been devised by Dr. Montessori and is protected by copyright.

Dr. Montessori's method is not so great a revolution in American teaching as in that of Italy. It contains many points not adaptable for use in American schools and many that are criticized by American educators, but its object, "to stimulate life and then leave it free to develop," is approved by all students of pedagogy. Excellent discussions of Dr. Montessori's work are *The Montessori Method*, by Dr. Montessori herself; Smith, *The Montessori System;* Dorothy Canfield Fisher, *A Montessori Mother;* Stevens, *A Guide to the Montessori Method.*

**Mon"tevid'eo,** the capital and chief port of Uruguay, situated on the northern coast of the Rio de la Plata estuary, 120 m. s.e. of Buenos Aires. It is among the cleanest cities in the world, and the principal street is one of the finest boulevards in South America. Among the buildings are the exchange, the Government House, the Cathedral, a university, several theaters, hospitals and churches. In 1899 arrangements were made to improve the shallow harbor, and by 1908 the new entrance channel admitted large steamers. The construction of an embankment and a new shore line south of the city was begun in 1909. Three extensive dry docks are now connected with the port. Manufactures exist chiefly for domestic purposes; the exports comprise live stock and animal products, wheat, flour, barley, tobacco, fruit and vegetables. The city was founded in 1726. Population in 1908, estimated at 312,946.

**Mon"tezu'ma** (about 1480-1520), the last Aztec Emperor of Mexico. Because of his merits as warrior and priest, he was elected emperor. In 1519 his realm was invaded by Cortez, whom, influenced by an ancient prophecy, he welcomed until discovering that he was only human. He then planned the Spaniards' destruction, but was himself seized. Though refusing to accept Christianity, he recognized the supremacy of Spain. When the Aztecs revolted against the Spaniards, and Montezuma, instigated by Cortez, tried to appease them, he was assailed. In his humiliation, he refused all nourishment and soon expired. See AZTEC; CORTEZ, HERNANDO.

**Mont'fort, Simon de,** EARL OF LEICESTER (about 1208-1265), an English statesman, famous in the story of the growth of democracy in England. Henry II, successor of John, violated his oath to observe the provisions of the Magna Charta and acted with even more tyranny than his father. In the uprising of the barons and people, that followed, De Montfort acted as leader, and the royal forces were defeated in the Battle of Lewes (1264). De Montfort now is-

sued, in the King's name, writs of summons to a meeting of Parliament, including not only barons, bishops and abbots, but knights and burghers. Thus in 1265 there assembled the first House of Commons, and for the first time untitled citizens took part in the deliberations of the great national council. De Montfort was killed in a war between the barons and the Royal Party, which broke out later in the same year.

**Montgom'ery, Ala.,** the capital and county seat of Montgomery Co., in the central part of the state, on the Alabama River, 180 m. n.e. of Mobile. It is on the Louisville & Nashville, the Mobile & Ohio, the Atlantic Coast Line, the Seaboard Air Line, the Central of Georgia and the Western of Alabama railroads, and is connected by boats on the Alabama with Mobile and thus with other ports. Montgomery lies in the fertile Black Belt Country and is surrounded by pleasant farming lands. Much money has been expended in improving roads, and those leading into Montgomery are well kept and greatly traveled. In the city the streets are equally well cared for and are excellently paved and shaded. The park reservations include about 100 acres; Oak Park is the largest of these. At the state fair grounds, near the outskirts of the city, the annual state fair is held. The waterworks system is municipally owned; the water supply is drawn from 19 artesian wells and is pronounced exceptionally pure by chemists.

The most important public building is the stately colonnaded capitol, in the hall of which the Confederate Government was organized. In recent years this building has been remodeled and greatly enlarged. Near it stands a fine Confederate monument erected by the women of Alabama. The county courthouse, the Federal Building, the Y. M. C. A. and Y. W. C. A. buildings, the city hall, a Pythian Temple, a Carnegie library and a Masonic Temple are among the interesting public buildings, and the business blocks of the city are modern and attractive; these latter include several new office buildings and hotels. There is a city infirmary; and a hospital, St. Margaret's, under the direction of the Sisters of Charity. The residences of Montgomery, surrounded by wide old-fashioned gardens and beautiful grounds, make it a pleasant city of homes. Aside from its public schools Montgomery is the seat of a state normal school for colored students, the Alabama College for Women and three high schools for boys.

The many railroads and the river, which is excellent for navigation, make this city an important shipping point. It is one of the chief interior cotton markets of the United States and sends out vegetables, fruits, nuts, timber and live stock from its prosperous farms. Montgomery is also a manufacturing center, and here are located six cotton-seed-oil mills, woodworking establishments, two sirup plants, carriage plants, seven fertilizer factories and three cotton mills. The milk- and meat-inspection laws and the sanitary system of the city have attracted widespread attention. All foodstuffs are carefully inspected and all garbage is destroyed by a modern incinerating plant.

The site of the city was once occupied by the Indian village of Ecunchatty. A white settlement was established in 1814 and the town was originally called New Philadelphia. In 1819 it was united with New Alabama Town under the name Montgomery, given in honor of Gen. Richard Montgomery. It was incorporated in 1837 and became the capital of the state in 1847. It was the capital of the Confederacy until 1861 and was, until captured by Federal troops in 1865, the seat of Confederate military factories. Its present charter dates from 1905. Population in 1910, 38,136.

**Montgomery, Richard** (1736-1775), an American general, born in Dublin County, Ireland. He was educated at St. Andrew's and at Trinity College, Dublin, and entered the British army in 1756. He served with credit and distinguished himself in the last French and Indian War; but left the service

in 1772 and settled in New York, where in 1775 he was delegate to the first provincial congress. The same year he became a brigadier-general in the Continental army, was made second in command to Schuyler in an expedition against Canada and seized Montreal. He was killed in the opening of the attack on Quebec. In 1818 his remains were brought from Quebec to St. Paul's Church, New York, where a memorial to him was erected.

**Month,** one of the 12 divisions of the year. The name is taken from *moon,* referring to one revolution of the moon around the earth. This period is 27 d., 7 h., 43.2 min., or a little less than 27⅓ days. This is the sidereal month. But as the moon also has a motion in connection with the earth, it requires longer for the moon to reach the same position relative to the sun than it had at the beginning of the revolution. This period is 29 d., 12 h., 44.05 min., and is the synodical month. The solar month is 1-12 of the solar year, or 30 d., 10 h., 29 1-12 min. See MOON; YEAR; also articles on the different months of the year.

**Montpe'lier, Vt.,** the capital of the state and county seat of Washington Co., 40 m. s.e. of Burlington, at the mouth of the north branch of the Winooski River, and on the Vermont Central and the Montpelier & Wells River railroads. It is situated in a beautiful valley surrounded by hills, and in an agricultural region. Valuable granite quarries are also in the vicinity. The city's industries are represented by flour mills, tanneries, creameries, granite and marble works and manufactories of hardware, leather and machinery. It controls a large portion of the trade of the surrounding country, and ships quantities of hay, potatoes, dairy products and poultry.

There are a number of stately edifices, including the capitol, which is built of granite, its dome rising to a height of 124 ft. and surmounted by a statue of Agriculture. Other features of the city are the Wood Art Gallery, the state and the Kellogg-Hubbard libraries and the Montpelier Seminary (Methodist). The first permanent settlement was made in 1787 by people from Massachusetts. It was organized as a town in 1791, and in 1805 Montpelier was selected as the capital of the state. For 40 years it maintained town, village and school district organizations, until 1894, when it received a city charter. Population in 1910, 7856.

**Montreal,** *Mont" re awl',* the largest city of the Dominion of Canada, situated in the Province of Quebec, on the southeast of the Island of Montreal at the junction of the St. Lawrence and Ottawa rivers, 180 m. s.w. of Quebec and 420 m. n. of New York. It is on the Canadian Pacific, the Intercolonial, the Grand Trunk, the Canadian Northern, the New York Central, the Delaware & Hudson, the Central Vermont and other railways. Steamship communication is maintained with British and European ports, as well as with those of the Gulf and Great Lakes. Montreal extends from the water front to and around Mt. Royal, on whose summit, 800 ft. above the sea, a public park of 460 acres is laid out. From the varying levels of the roadway winding up the mountainside the view of the city below is one of great natural beauty and picturesqueness. Not far distant from Mt. Royal are the Laurentian Mountains, Lake St. Louis and the Lachine Rapids, and on the southern horizon can be discerned the Adirondack and Green mountains.

STREETS, PARKS AND MONUMENTS. There are a great number of fine residence streets, many of them forming terraces up the slopes of the mountain. The Lachine Canal winds between the mountain and the river; in the middle of the river rises St. Helen's Island to a height of 150 ft. above water. It is beautifully wooded, commands a fine view of the city, and though formerly purchased for military purposes it is now loaned to the city for use as a public park. In addition to this and Mt. Royal Park are the St. Louis and Lafontaine

parks and the Viger Gardens. Among the public squares is Place d' Armes, in which stands a bronze monument erected to the memory of Maisonneuve, the founder of Montreal. Dominion Square contains a statue of Sir John MacDonald and a monument to the Canadian soldiers who fell in the Boer War. This was also the site of the ice palace which was stormed by torchlight during the winter carnivals of the past. Jacques Cartier Square has a column and statue of Lord Nelson, and two Russian guns from the victory of Sebastopol; Victoria Square, the site of the old hay market, is at the foot of the Beaver Hall Hill, and has a bronze statue of Queen Victoria; Champ de Mars is the old parade ground of the French and British troops, and the historic Bonsecours Market is still retained as a place of interest.

Public Buildings, Institutions and Societies. Both the public and private buildings are chiefly of substantial, gray limestone, quarried from the mountain. The Church of Notre Dame, one of the largest cathedrals in America, was built in 1824; its size (it accommodates 10,000 people) and Gothic architecture make it an imposing edifice. In one of its twin towers is the famous bell, Le Gros Bourdon, weighing over 11 tons. There are ten bells in all, and the chimes possess great beauty of tone. The Cathedral of St. James is a reproduction, on about one-half the scale, of St. Peter's at Rome. Its sloping roof throws off the winter snows, but other modifications of the plan of the original are slight. There are also the Notre Dame of Lourdes, Notre Dame de Bonsecours, the Church of St. James, the Apostle, St. George's Church, Christ Church Cathedral and the Order of the Grey Nuns. Among secular buildings are the city hall, the courthouse, the custom-house, the Board of Trade, the stations of the Canadian Pacific and the Grand Trunk railways, the Victoria Rifles and Royal Scots armories, the Drill Sheds, the Windsor Hotel, the offices of the Bank of Montreal, the Château de Ramesay, the Fraser Institute, the art gallery, a public library, asylums for the blind and deaf and dumb, the Royal Victoria Hospital, the Montreal General Hospital and the Hôtel Dieu.

There are two distinct systems of public schools, one for Roman Catholics and the other for Protestants. The city is the seat of McGill University, with its many colleges, large museums and library, the Presbyterian College, the Veterinary College, St. Mary's, or the Jesuit College, the Montreal branch of the Laval University of Quebec, the Villa Maria Convent School for girls, the school of the Nuns of the Sacred Heart, Presbyterian and Wesleyan colleges and the Collège de Montreal, or Petit Séminaire.

Commerce and Industries. Montreal ranks next to New York and New Orleans as a port of entry. It has a fine harbor, the quays, docks, wharves of solid masonry extending for seven miles along the water front. By means of the Lachine Canal, together with a system of rivers and artificial waterways, the resources of the Northwest can be transported over a continuous inland waterway from Port Arthur to Montreal, and from that point through the St. Lawrence River to European ports. The Victoria Bridge, built by the Grand Trunk Railway, is almost two miles in length, one of the longest bridges in the world. The graceful cantilever bridge of the Canadian Pacific Railway spans the river at Lachine. The wealth and commercial importance of the city have resulted from the large trade in fur, lumber and grain of the Northwest. Montreal ships more grain than any other port of the continent, except New York and New Orleans, and with the completion of the Georgian Bay Canal the facilities for transportation will be greatly furthered. It is now the chief export center for dairy produce. The Bank of Montreal is one of the greatest banks in the world, and in addition to more than 25 other banks are offices of the principal insurance companies and of the two largest railways of the coun-

try, all of which make it an important financial center as well.

The industrial plants include about 900 factories, whose products are boots and shoes, clothing, refined sugar, tobacco, rubber, machinery, tools, silk, cotton, woolens, paints, carriages, electric goods, sleighs, railway rolling stock and musical instruments. Of the numerous grain mills the Ogilvie Flour Mill is the largest in the British Empire. There are also iron and brass foundries, lead works and lumber mills. The electric street railways, gas and electric-light plants and the system of waterworks are costly. On Mt. Royal is a reservoir hewn out of the solid rock with a capacity of 36,500,000 gallons; from this the city obtains an ample water supply.

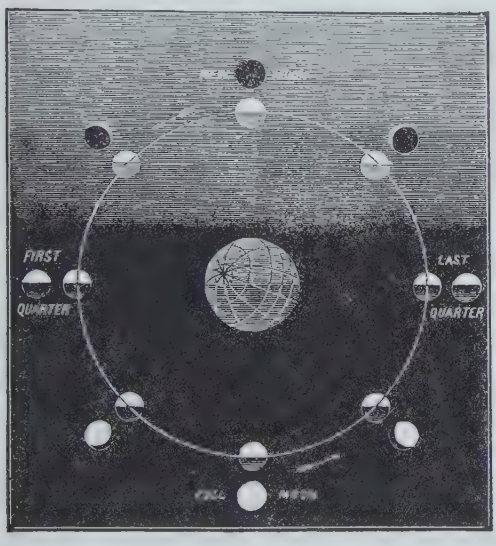
Government and History. Montreal returns six members to the Provincial Legislature of Quebec and five to the Dominion House of Commons. It is governed by a mayor and 36 aldermen, elections occurring every two years. In 1535 Jacques Cartier ascended the St. Lawrence River and discovered the Indian village of Hochelaga on the present site of the city. Champlain visited the spot in 1603, found it deserted as a result of the ravages of Indian warfare, and established a trading post there eight years later. Maisonneuve and his band of ardent missionaries arrived in 1642, and the "Ville Marie-de-Montreal" was founded, the place soon to become intimately associated with as noble missionary enterprise and heroism as the world has ever witnessed. The work of christianizing and educating the Indians advanced slowly, and soon the religious phases of life in the town were changed, and it became a military post and a commercial center. By 1672 it was the center of the fur trade. For a century and more, priests, soldiers and traders gave to life in the town respectively its somber, jovial and savage features, and even at present one of the most striking phases of Montreal life is its peculiar mingling of occupations, creeds and races. The more romantic days of pioneer life have yielded, however, to the strenuous demands of its extensive commercial and trading life. It was the seat of the Canadian Government from 1844 to 1849. About three-fifths of the inhabitants are French and three-fourths are Roman Catholics. Population in 1911, 470,480.

**Moody, Dwight Lyman** (1837-1899), a Christian evangelist, born at Northfield, Mass. He began life as a clerk in a Boston shoe store, where he remained two years, going to Chicago in 1856. He entered earnestly into Christian work in that city and built up a Sunday school of about 1000 children. His work as an evangelist was remarkably successful. A church which was built for him in Chicago was burned in the great fire of 1871, and another, seating 2500 people, was erected. Accompanied by the singer, Ira D. Sankey, he held revival meetings throughout the United States and in other countries, visiting England in 1873 and again in 1882. He was the founder of a seminary for young women, a training school for Christian workers, the Mt. Hermon School for Boys, all at or near Northfield, Mass.; and of the Moody Bible Institute, Chicago. He wrote several religious books.

**Moody, William Vaughn** (1869-1910), an American poet and dramatist, born in Spencer, Ind. After graduating at Harvard University he became instructor in English literature there, later holding the assistant professorship of English literature at the University of Chicago. His premature death ended a literary career of great promise. His early poems had the dignity, maturity and intellectual quality of a scholarly mind, giving sure evidence, as well, of a genuine poetic gift. Besides a volume of poetry, he wrote two dramas—*The Great Divide* and *The Faith Healer*—the former of which was very successful; an essay on Milton for the edition of Milton's poems which he edited; and, in collaboration with Robert M. Lovett, *A History of English Literature*. Notable among his poems are *An Ode in Time of Hesitation, The Masque of Judgment* and *The Fire-Bringer*.

MOON

**Moon,** the earth's satellite. The moon accompanies the earth in its revolution around the sun, and revolves about the earth in a nearly circular orbit. Its mean diameter is 2160 m., or a little more than one-fourth that of the earth. It would take 50 moons to make a body as large as the earth, and 80 moons to equal the earth in weight. A man weighing 200 lb. on the earth would weigh about 40 lb. on the moon. The mean distance of the moon from the earth is, in round numbers, 239,000 m. It makes a complete revolution in its orbit in a little over 29½ days, exactly 29 d., 12 h., 44.05 min. This period constitutes the synodical month, and extends from one new moon to another.




PHASES OF THE MOON

The moon makes a rotation on its axis in the same time that it revolves about the earth. The same side of the moon is, therefore, always turned towards the earth. This peculiarity of the moon is easily illustrated by placing any object upon a table and then walking around the table, taking care to face the object while making the circuit. In completing the circuit the observer will turn around once.

The moon is a dark body and shines by reflected light of the sun. At the time of the new moon, when the moon is directly between the earth and the sun, the moon is for a brief time invisible, but as soon as it passes this point the crescent of the new moon appears. This continues to increase until one-half the lighted portion is turned toward the earth and we have the first quarter. From the first quarter the lighted portion continues to increase until the moon reaches that point in its orbit where the earth is between it and the sun, and the whole lighted portion is visible, constituting the full moon. From this point the moon begins to wane and passes in reverse order through the same phases as between the new and the full moon. The accompanying illustration makes this plain. In some latitudes where the atmosphere is very clear one may be able to read by the light of the full moon, but it would take 600,000 full moons to produce a light equal to that of the sun.

When seen with the naked eye, the moon presents dark and light objects, the dark objects forming what is familiarly known as the "man in the moon." The telescope reveals the fact that the light portions are elevations and the dark portions depressions on the moon's surface. By means of the telescope, the moon's surface turned toward the earth has been accurately mapped, and is better known to astronomers than some portions of the earth's surface, such as the interior of Australia and the South Polar regions, are to geographers. The surface is very irregular, being made up of lofty mountain ranges, deep valleys and volcanic peaks, with extinct craters, some of which are estimated to exceed 10,000 ft. in depth. Some of the mountains are estimated to be at least 24,000 ft. in altitude, equaling the highest peaks on the earth. The principal range is the Lunar Alps, and the prominent peaks and craters have been named after leading scientists, as Copernicus, Kepler, Linné and Aristarchus.

By attaching a photographer's apparatus to a large telescope, clear and ac-

curate representations of the moon's surface have been obtained. The accompanying half tone gives a view of the moon at quarter as seen through the great refracting telescope of the Yerkes Observatory at Williams Bay, Wis., and shows the moon as it would appear if seen with the naked eye at a distance of 250 m.

The most careful observations show that the moon has no atmosphere. The most valid reasons for this conclusion are the very distinct outline of objects on its surface as seen through the telescope, and the absence of haze in all views of eclipses and occultations. In each case the disk of the moon is sharply defined. Were an atmosphere present, this would not be possible. There is neither water nor life on the moon.

The moon is our nearest neighbor and exerts considerable influence upon the earth. It is the cause of tides and eclipses, but the superstition that the moon affects the weather has long since been proved false. Notwithstanding this, however, there are many people who are still guided by the phases of the moon in planting their corn and killing their pigs. It was formerly supposed that moonlight was a cause of insanity; hence the terms "lunacy" and "moonstruck." See ECLIPSE; TIDES.

**Moore,** *Moor,* **George** (1853- ), a British novelist and dramatist, born in Ireland. He began his literary career with contributions to periodicals, and in 1877 and 1881, respectively, published volumes of verse entitled *Flowers of Passion* and *Pagan Poems.* Later he became interested in the modern Irish literary movement, and joined with William Butler Yeats in the founding of the Irish Literary Theater. His volume of "confessions," entitled *Hail and Farewell,* contains a candid and illuminating exposition of the movement frequently termed the Irish renaissance. His comedy, *The Bending of the Bough* (1900), was produced by the Irish Literary Theater in Dublin; the following year appeared his *Diarmuid and Grania,* written in collaboration with William B. Yeats. As a novelist, Moore is identified with the French School of realistic fiction, whose most eminent representative is Zola. Moore's other writings include the novels—*A Modern Lover, A Mummer's Wife, Esther Waters* and *Sister Teresa;* and *Confessions of a Young Man, Impressions and Opinions, Modern Painting* and *Memoirs of My Dead Life.*

**Moore, Thomas** (1779-1852), an Irish poet, born in Dublin. He studied at Trinity College, but won slight honor except fame as a wit. In 1799 he went to London and published his *Anacreon* by subscription, the Prince of Wales playing the part of the patron and accepting the dedication of the poem. His appointment as admiralty registrar at Bermuda failed to please him and he intrusted the duties to a deputy, but in 1817 this deputy's neglect and embezzlement caused trouble, and Moore retreated to the Continent to avoid a debtor's prison. He met Byron in Venice, returned to England in 1822 and several years later was granted both a literary and a civil pension. His lyrics, especially the *Irish Melodies,* were very popular because of their grace and airiness, and his Oriental romance, *Lalla Rookh,* with its vivid local coloring, dazzled his contemporaries and was widely read and translated. He also wrote *The Fudge Family in Paris, The Loves of the Angels, The Memoirs of Captain Rock, The Epicurean, History of Ireland* and the classic *Life of Byron.* His charming lyrics, *Oft in the Stilly Night* and *The Harp that Once Through Tara's Halls,* have long been favorites. Moore enjoyed great popularity in his day.

**Moor Fowl,** a bird of the Grouse Family. It is about 16 inches long, of reddish-brown color, barred or speckled with black. The nest is made on the ground and a number of spotted eggs are laid. The moor fowl is a favorite game bird in Great Britain, where it is snared for the market, as well as bred for food. It is common on the mountains and moors and is the only bird confined solely to the British Isles.

THE MOON

This is a photograph of the Moon as seen through the telescope of the Yerkes Observatory

**Moors,** a name loosely applied to any natives of Morocco, but used more strictly to designate the Mohammedans of mixed descent of the Barbary States. The Arabians conquered these states in the seventh century. The Mohammedans who conquered the Visigoths in Spain came from Africa and were called Moors by the Spaniards. They invaded France but were driven back by Charles Martel at the Battle of Tours in 732. They then settled in the southern part of Spain and set up an independent caliphate in Spain, with Cordova as the chief city. Here for centuries was the best civilization in Europe.

Charlemagne invaded the kingdom, and as the country grew weaker, the little Christian states in the mountains began a gradual conquest of the country. In 1492, by the united efforts of Isabella of Castile, and Ferdinand of Aragon, the last Moorish stronghold, Granada, was taken. Many Moors left for Africa, and those who remained were persecuted by the following sovereigns, finally being banished by Philip III in 1609. As the Moors were the most industrious and enterprising part of the people, their expulsion was one of the chief causes for the decline of Spain. The Moors in the Barbary States were noted pirates until the 19th century. They are a handsome white race, intellectual and courteous, but cruel.

**Moose,** the largest existing member of the Deer Family, differing only slightly from the European elk. It was once common throughout the United States but is now rarely found south of Maine and Minnesota; it is still abundant in Canada and Alaska. The moose is a powerful, ungainly animal with long legs, large head, somewhat humped shoulders and huge, flattened antlers divided into many irregular prongs. The nose is long and so rounding at the end that the nostrils seem to lie almost underneath. Below the neck hangs a hairy, bell-like fold of skin which in old age forms a sort of pouch. Though the moose when brought to bay is a dangerous foe, it is capable of domestication and the young are readily tamed. See WAPITI; ELK.

**Moose'head" Lake,** the largest lake of the State of Maine, located on the border of Somerset and Piscataquis counties. It is about 35 m. long and varies in width from 1 to 10 m. Moosehead Lake receives the Moose River and drains into the Kennebec and the Penobscot. The surrounding country is a wild forest region in which game is still found. A railroad has been built along the southern shore of the lake.

**Moose Jaw,** a city of Canada in the Province of Saskatchewan, at the confluence of the Moose Jaw River and Thunder Bay Creek, on the Soo line and Outlook branches of the Canadian Pacific Railway, 400 m. w. of Winnipeg. The city is a railroad division point. There are large stockyards in the city and it is a stock-shipping center. The neighborhood supplies brick clay, gravel and coal. Among the leading buildings are churches, the Dominion Lands Office, the post office, a hospital and a custom-office. The leading industrial plants include grain elevators, flour, cereal, oatmeal, feed and chopping mills, electric-light, brick and cement-block plants, a brewery, a sash and door factory, machine shops and wholesale lumber establishments. Population in 1911, 13,823.

**Moraine,** *Mo rane'*. See GLACIER.

**Moran', Thomas** (1837- ), an American etcher, illustrator and landscape painter, born at Bolton, England. He removed to the United States in 1844 and was educated in Philadelphia. He was apprenticed to a wood engraver, then studied art under James Hamilton and, later, in Paris and Italy. Returning to the United States in 1871, he made sketches of scenes in the Yellowstone; the *Grand Cañon of the Yellowstone,* now in the Capitol at Washington, was produced from these sketches. Later expeditions in the West resulted in pictures of the chasm of the Colorado and the Mountain of the Holy Cross. His paintings are similar to those of the English painter Turner in their brilliance of coloring. Among his notable can-

vases are *The Conemaugh in Autumn, The Track of the Storm, After a Thaw* and *the Lost Arrow.*

**Mora'via,** a crownland of Austria-Hungary lying in the northwestern part, and bounded on the n. by the Province of Silesia and Germany, on the e. by Silesia and Hungary, on the s. by Lower Austria and on the w. by Bohemia. This crownland, or province, has an area of 8578 sq. m. and consists of a high plateau almost surrounded by mountains. The plateau itself is fertile and produces cereals, fruits, flax and sugar beets in abundance; in consequence, textile manufactories and sugar mills are common. Iron, coal and graphite are the chief mineral products. Cattle raising is profitable and live stock of all kinds are found. The lesser industries include the manufacture of wine, beer, alcohol, brandy, iron and steel products and cigars, and the weaving of woolens. Moravia and Bohemia have been closely united in their history, but the former has been under Austrian rule since 1526. The inhabitants are Czechs, Moravians, Slovaks and Germans and are almost entirely Roman Catholic in their religion. Brünn, the capital, is also the principal city. Population, 3,623,000.

**Mora'vians,** the members of an evangelical Church which originated among the followers of John Huss, in Bohemia and Moravia. The denomination is also known as the Church of the United Brethren. The Moravians increased in numbers and strength during the Reformation period, in 1617 numbering about 200,000, but later persecutions greatly weakened them. Johann Amos Comenius, one of their early bishops, was instrumental in keeping alive the spirit of the Moravian movement. In 1722, some of those who had fled to Saxony to secure religious liberty began to build the town of Herrnhut, which became a center for Moravians. The organization of Brethren took a new form under the leading bishop, Count Zinzendorf. John Wesley, the founder of Methodism, owed his initial inspiration to a band of Moravian emigrants, while on his way to America. The Moravians are especially active in foreign missionary enterprise, being the first Protestants to declare that the evangelization of the heathen was the duty of the Church as such. The Moravian Church now consists of four provinces —the German, the British and the American, North and South. The affairs of each province are administered by a synod, but the four are united in respect to doctrine, ritual, discipline and missionary endeavor. The Church has a complete ritual; its doctrines are similar to those of other evangelical bodies. The people are simple and earnest in the profession of their faith. In 1909 their world membership was 62,096. The Moravians of the United States numbered 17,940 in 1911.

**Mor'dants,** certain chemical substances employed in dyeing and calico printing for the purpose of fixing colors. The term is sometimes applied also to the material used to make gold leaf adhere in gilding. Among the most common mordants employed in dyeing textiles are the several salts of iron, aluminum sulphate and alum; and bichromate of potassium, all known as basic mordants, and used in the first part of the process of dyeing. Acid mordants, or those used in the last process, consist chiefly of tannic acid and the salts of sodium and of potassium dissolved in water. Mordants work on the principle of chemical action, combining with the dyestuffs used with them and forming a stable, permanent compound that holds or fixes the colors in the fibers. See DYEING.

**More, Hannah** (1745-1833), an English author, born at Stapleton. She became famous for her religious writings, her active work along the lines of charity and for her clever, witty verse and conversation. The popularity of her deeply moral and religious novels was extraordinary. She wrote *Sacred Dramas, Strictures on Female Education, Cœlebs in Search of a Wife, Christian Morals* and *The Shepherd of Salisbury Plain.*

**More, Sir Thomas** (1478-1535), an English author and statesman, born in London. In 1497 he went to Oxford, where he made the friendship of Erasmus, and he later applied himself to the study of law, entering Parliament in 1504. He opposed the grants of certain moneys to Henry VII, incurred that ruler's displeasure and soon left Parliament; but Henry VIII sent him on several missions abroad, and in 1514 he was made a privy councilor. Thus began his public life. When the Reformation was talked of in England, More supported Henry's defense of the Roman Catholic Church, and in 1529, when prosecution was opened against Wolsey, the King made More lord chancellor. Later Henry tried in vain to obtain More's authority for a divorce from Catharine of Aragon and a marriage with Anne Boleyn. When More refused, Henry's favor turned to fury. He had More committed to the Tower, where he subsequently refused to take an oath excluding Catharine's daughter from the throne and accepting Henry as head of the Church. Following an imprisonment of 13 months, More was brought to trial at Westminster, in May, 1535. He was convicted of high treason by perjury and injustice, and in July he was beheaded, to the consternation of all Europe, for his sweetness and blamelessness of his life, together with his learning and probity, made him then, as now, one of the most revered characters of history. More's important literary work, *Utopia,* is written in Latin. It is the conception of an ideal and imaginary commonwealth located in the Atlantic.

**Mor'gan, Daniel** (1736-1802), an American soldier, born of Welsh descent in Hunterdon County, N. J. He removed to Virginia in 1753, fought with Braddock, and at the opening of the Revolution was commissioned a captain of Virginia riflemen. He commanded at Quebec after Arnold was wounded. He was prominent in the Saratoga campaign and distinguished himself at the Cowpens. Previously he had risen to the rank of brigadier-general. In 1793 Morgan was made major-general of the Virginia militia, and in 1794 he commanded troops sent to suppress the Whiskey Insurrection. In 1797 he represented Virginia in Congress.

**Morgan, John Hunt** (1825-1864), an American soldier, born in Huntsville, Ala. In 1830 he settled near Lexington, Ky., with his parents. He served under Taylor in the Mexican War, and in 1861 he joined the Confederates. At Shiloh he commanded a squadron of cavalry; but his first notable exploit was his raid into Kentucky from eastern Tennessee in July, 1861, and his "Christmas Raid" of Kentucky the following year secured him promotion and a vote of thanks. In June, 1863, in an attempt to distract General Rosecrans from his advance into Tennessee, Morgan crossed the Ohio and pillaged Indiana and Ohio towns. But these states speedily arose and hemmed him in. While hurrying to join Lee in Pennsylvania, Morgan was obliged to surrender to General Shackelford on July 26, 1863. In November he escaped from the penitentiary at Columbus, Ohio, and with an independent following he later did effective work till defeated near Cynthiana, Ky. Then he fell back to Greenville, Tenn., where he was betrayed and shot on Sept. 4, 1864.

**Morgan, John Pierpont** (1837-1913), a noted American financier, born at Hartford, Conn., and educated at Boston and at the University of Göttingen. He began his business career in 1857, as a clerk in the house of Duncan, Sherman & Company, three years later becoming the United States agent for Peabody & Company. In 1869, while a member of the firm of Dabney, Morgan & Company, organized by himself to deal in investment securities, he began the long series of railway organizations that later made him famous. Between 1880 and 1900 Mr. Morgan's influence in financial matters assumed tremendous proportions. He saved from bankruptcy such railways as the Erie, the Reading, the Southern, the Northern Pacific

and the Lehigh Valley, and during the years of financial stringency between 1893 and 1897, when 500 banks closed their doors, he rehabilitated the credit of the United States. The period beginning in 1900 witnessed the reorganization of the steel industry, probably the most stupendous of Mr. Morgan's enterprises. Among other achievements of lasting importance, he used his power and influence to avert the financial panic of 1907. After his death, his services were thus summarized: "Perhaps no one man in the history of our finances has rehabilitated so much property threatened with ruin and financial extinction."

Mr. Morgan was also famous as a collector of art treasures and rare books. These are to be found in his own private library—one of New York's finest buildings—in the Metropolitan Museum and in many Europeans museums. Among the famous canvases he possessed are Gainsborough's *Duchess of Devonshire* and Hobbema's *Landscape.* Among his rare books are the Golden Gospels once owned by Henry VIII, two Mazarin Bibles, Shakespeare folios and quartos, and first editions or manuscripts of many literary masterpieces. He was also a generous helper of good causes; the New York Lying-In Hospital, the Harvard Medical School, the New York Trade Schools and the Cathedral of St. John the Divine are a few of the many institutions to which he has made liberal gifts. Personally he was a man of sterling character—just, upright, sincere and deeply religious.

**Morgan, John Tyler** (1824-1907), a political leader and United States senator, born at Athens, Tenn. While still a young lad his parents moved to Alabama, where he was educated for the law. He joined the Confederate army in 1861 as a private, being made colonel the following year and brigadier-general in 1863. In 1877 he was elected to the United States Senate and continued a member of that body for 30 years. During his long period of public service Senator Morgan was recognized as one of the ablest leaders of his party. A student of world politics, he became thoroughly versed in our relations with foreign nations. He was for years a member of the committee on foreign relations, and most of this time its chairman. He was a member of the commission to settle the Bering Sea fisheries dispute, and of the commission that formulated the laws and organized the Government of Hawaii.

**Morgantown, W. Va.,** a city and the country seat of Monongalia Co., 102 m. s. of Pittsburgh, Pa., on the Monongahela River and on the Baltimore & Ohio, the Morgantown & Kingwood and other railroads. The river is navigable to Fairmont; from Morgantown to points on the river from 25 to 30 m. above the city there is considerable steamboat traffic. The region in which the city is situated abounds in natural resources. There are oil fields in the vicinity, extensive forests, rich deposits of coal, glass sand, clay, iron and limestone and good water power. In the town are several glass factories, manufacturing window glass, pressed prism glass, wire glass and mirrors; also foundries, brickworks, utility works, a publishing house and other establishments. A substantial trade is carried on in coal, coke, oil, live stock and manufactured articles. At Morgantown is located West Virginia University (See WEST VIRGINIA UNIVERSITY). The city has a fine courthouse and several other handsome buildings. The first settlement on the site was made in 1768 by David and Zackwill Morgan, in whose honor it was named. The place was incorporated as Morgan's Town in 1785. In 1905 it received its city charter. Population in 1910, 9150.

**Morine,** *Mo reen',* **Alfred Bishop** (1857- ), a Canadian statesman, born in Nova Scotia and educated at Dalhousie University. He has practiced law at St. John's and in Toronto. As a young man he was correspondent at Ottawa for the Halifax *Herald* and the St. John's *Sun,* later successively editing the Halifax *New Era,* the Annapolis *Spectator,* the St. John's *Mercury*

and the St. John's *Herald*. In 1886 he entered Parliament as an Independent candidate, retaining his seat in the Newfoundland Assembly until 1906. Meanwhile, in 1894, he became colonial secretary; in 1897, receiver-general; and later, minister of marine and fisheries.

**Mor'ley, John** (1838- ), an English statesman and author, born at Blackburn, England. He studied at Cheltenham and Oxford, and was later admitted to the bar. He began editorial work in 1867, being five years on the *Fortnightly Review,* three years on the *Pall Mall Gazette* and two years on *Macmillan's Magazine*. During the time he was editor of the last-named magazine he was also a member of Parliament. In 1886 he was made chief secretary of Ireland. In 1905 he became secretary of state in charge of the Indian Empire, a position which he filled with marked ability and great advantage both to India and Great Britain until his resignation, on account of advanced age, in 1910.

**Mor'mons,** a religious sect founded by Joseph Smith at Fayette, N. Y., in 1830. They are also known as the Church of Jesus Christ of Latter Day Saints. Smith claimed that he was visited by an angel as early as 1823 and again in 1827. On the latter occasion there was revealed to him the spot on what is now known as Mormon Hill, where the bible of the Western continent, the supplement of the New Testament, was buried. Following the angel's directions Smith found a book consisting of gold plates, bound together with gold rings. The writing was in an unknown letter and a strange language, but the Urim and Thummim accompanied the book, and as Smith ran these down the page the writing was transformed into English, which he read to amanuenses, who wrote the translation. This revelation was published in 1830 as *The Book of Mormon*. After the unsealed pages had been transcribed, the book was taken away by the angel. Oliver Cowdery, Martin Harris and David Whitmer united in an affidavit, which accompanied the preface, that an angel from heaven had shown them the plates from which the book was transcribed. Their testimony was supplemented by that of eight other witnesses who claimed that they had seen the book. Converts to the new sect were rapidly made and in a short time Smith had a substantial following.

In 1831 the Mormons moved to Kirtland, Ohio, where they expected to found a permanent community. A bank was started with Smith as president, a stone temple was built and a large area platted for a city. Here the organization of the Church was completed, Smith being the first president and head of the organization. Later 12 apostles and 70 elders were added. The practices and teachings of the sect soon led to their persecution by nonbelievers. The bank failed and the leaders of the organization were compelled to flee for safety. They went to Jackson County, Mo., where a colony had been started near Independence.

This colony increased rapidly, but soon came into conflict with the non-Mormons and the state authorities, and in 1838 the entire colony, numbering about 15,000, removed to Hancock County, Ill., where they founded the city of Nauvoo. Meanwhile Mormon missionaries had been active throughout the United States and Europe and converts continued to be added to their numbers. Smith secured from the state authorities a charter, which gave him almost absolute authority over Nauvoo and its inhabitants. Dissensions arose and Smith soon encountered opposition from some of his followers, as well as from the other citizens of the county. Another crisis was reached in 1843, when Smith and other leaders were accused of practicing polygamy. Doubtless the charge was without foundation, but a Mormon paper, the *Expositor,* denounced the Mormon officiary, and the editors were brought to trial and their printing plant was demolished. The state militia was ordered out to quell the disturbance. Smith and his brother Hyrum were arrested and lodged in jail in Carthage, the county

seat, where during the night they were shot to death by a mob on June 27, 1844.

Brigham Young succeeded Smith as president, and it was during his long regime that the Mormons were established in their new home and became a large and prosperous community, which developed into the Territory and later the State of Utah. A man of iron will, pursuasive eloquence and remarkable foresight, Young was one of the most astute leaders this country has produced. Under his leadership the colony emigrated to the borders of Great Salt Lake. Here by means of irrigation they transformed a barren desert into a fruitful valley. The journey was one of untold hardship and many perished on the way, but in the first ten years the new community became established on a permanent basis. They had considerable trouble with outside organizations, especially the United States Government, because of their practice of polygamy. Although Utah was organized as a territory in 1849 it was not admitted as a state until 1896, because of the Mormons' general belief in plural marriages. In 1882 Congress passed the Edmunds Law, which disfranchised all men living in polygamy, and in 1890 the president of the Mormon Church issued a decree forbidding plural marriages.

Some Mormons claim that the doctrine of polygamy was introduced by Joseph Smith, but others claim that it was introduced by Brigham Young after the colony reached Utah. The *Book of Mormon* contains a strong denunciation of polygamy, and its introduction caused a division in the church, those opposed to the practice forming the Reorganized Church of the Latter Day Saints. The Mormons believe in the Bible, supplemented by the *Book of Mormon,* which teaches the gift of revelation through the president of the Church, and that salvation can be attained only through redemption in Christ, repentance and baptism by divinely appointed apostles. In the United States the regular branch has about 350,000 communicants, and the Reorganized Church about 50,000. See Salt Lake City; Utah, subhead *History*; Smith, Joseph; Young, Brigham.

**Morn'ing-Glory,** a twining or trailing vine of the Convolvulus Family, common along low fences and in yards, where it was once cultivated but has since run wild. The leaves have a variety of shapes, but are mostly pointed and heart-shaped. The flowers, which open either at sunrise or at sunset, but soon close, are of a variety of colors and are broadly trumpet-shaped, with darker stripes running from the tube to the margin. The morning-glory blooms through the entire summer and belongs to a genus closely allied to the less aristocratic bindweeds.

MORNING-GLORY

**Morocco,** *Mo rok' o,* an African empire occupying the northwest corner of the continent, touching the Atlantic Ocean, the Straits of Gibraltar and the Mediterranean on the w. and n., and surrounded by French territory upon the e. and s. Its area is estimated at 219,000 sq. m. The central portion is traversed by the great chains of the Atlas Mountains, whose rounded summits bear forests of valuable wood. The rivers at the north of the mountains are large and turbulent; those upon the south are sluggish and run dry in summer. There are few good harbors along the low unbroken coast; Tangier and Mogador are the best, and the little port of Agadir at the south might be made valuable.

Although Morocco has mineral and agricultural resources, they have been little developed. Copper, iron, antimony and lead lie unmined in the mountains,

and amethysts of value are known to exist in the hills. The natural vegetation of Morocco grows in abundance, indicating that agriculture might be practiced to advantage, but other than small fields of grains and some vegetables, little farm land is cultivated. The date is the principal article of food and is used in a variety of ways. The caring for herds and flocks is the chief pursuit, and the horses from Morocco are of world-wide fame. In the cities the manufacture of carpets, cloth, caps, especially the "fez," and metal ornaments is largely carried on.

The people of Morocco are of several distinct races. The Berbers and the Arabs predominate, while the Moors, a mixture of the two races, are next in numbers. There are many Jews in the cities, but the number of Europeans in the entire country is probably less than 4000. The country is governed by a despotic sultan, whose authority is absolute in religious and governmental affairs. His rule, however, is sometimes disputed by the Moors, and the aid of foreign countries is necessary to maintain peace. France claims the chief right to give its protection to the country. Morocco was known as Mauretania by the Romans, who controlled it until the fifth century, after which it was successively held by the Vandals, the Byzantines and the Saracens. During the domination of the latter in the Middle Ages, Morocco was the seat of Mohammedan learning. Spanish and French influence have long been rivals in Morocco, and when an agreement between Great Britain and France was entered into, whereby Great Britain gained complete control of Egypt and gave Morocco to the protection of France, Spain made serious objections, which finally resulted in the Treaty of Algeciras (Spain). This treaty did not, however, wholly settle differences. In 1912 Morocco became a French protectorate. The population is indefinitely estimated between 4,500,000 and 5,000,000.

**Morocco,** one of the capitals of the Sultanate of Morocco, situated on a fertile slope of the Great Atlas Range. The climate is healthful, but the buildings as well as the walls of the city are in a dilapidated condition, and the streets are ill kept, unpaved and irregular. There are several open market places and bazaars, 19 mosques and an imperial palace, which the sultan seldom visits. The manufacture of Morocco leather has declined in importance and the industries of the city are now of little value. Civil wars and rebellions have caused the former splendor of the city to vanish; in the 13th and the 14th centuries it was a famous Mohammedan center of learning, and its population was estimated at 700,000. The city was founded about 1072. Population, from 50,000 to 60,000.

**Morocco,** a superior, tough leather, made from skins of the goat, in the Levant, Spain and Belgium. It is tanned very carefully, dyed and grained, the art being derived from the Moors; hence the name of the leather. It is used in making fine shoes, for upholstering furniture and for binding books. Much of the so-called morocco is sheepskin, tanned and grained in imitation of the genuine article. See LEATHER.

**Morpheus,** *Mor' fus,* in classic myths the son of Somnus, the god of sleep. By the Romans he was considered the god of dreams, and was believed to have power to call up all sorts of human shapes and make them appear before the dreamer. He was the twin brother of Death.

**Morphine,** *Mor' fin,* an alkaloid found in opium. It is a white crystalline substance having a bitter taste, with narcotic properties, and except in very small doses is poisonous. It acts more quickly as a medicine than opium, and is usually administered by injection through the skin, where it is readily absorbed into the system, producing sleep. It is also a powerful emetic. The morphine habit tends to make one pale, dyspeptic and devoid of all moral responsibility. See OPIUM.

**Morphology,** *Mor fol' o jy,* the scientific study of the external and internal structure of plants and animals with re-

gard to their development, but without regard to their uses.

A study of the morphology of a plant lends added interest to botanical work, since it shows how the plant adopts the form best fitted to its needs. A close study of the arrangement of flowers shows that they are only specialized branches upon which the floral parts take the place of leaves. A sensible gradation from leaves to petals and sepals is shown in the wild painted-cup, whose leaves just underneath the flowers are as brightly colored as the flowers. The petals of the rose and of the water lily change, by a series of intermediate steps, into stamens. Even the pistil of a flower is shown to begin its development in a form exactly the same as that of a leaf. In botanical work morphology is often spoken of as structural botany.

**Mor'rill, Justin Smith** (1810-1898), a United States senator, born at Strafford, Vt. After a common school education he engaged in business, then in agriculture. He was a member of Congress from 1855 to 1867, when he became United States senator, serving in that capacity until his death. He was the author of the Morrill tariff bill of 1861, and of the bill establishing agricultural colleges and experiment stations. See AGRICULTURE; TARIFF.

**Mor'ris, Gouverneur** (1752-1816), an American statesman, born at Morrisania, N. Y. He graduated from King's College (now Columbia) in 1768, and was admitted to the bar in 1771. In 1776 he helped to draft the New York state constitution, and the following year he became a member of the Continental Congress, where he served until 1780. From 1781 to 1785 he assisted Robert Morris in connection with the financial affairs of the nation. In 1787 he was a member of the Federal Convention that drafted the Federal Constitution, assisting in the final revision of that document. President Washington appointed him minister to France in 1792, where he remained until 1794, after which he made an extended tour through Europe. He was in the United States Senate from 1800 to 1803. From 1810 until his death he was chairman of the commission which had charge of the Erie Canal, and was greatly interested in that enterprise.

**Morris, Robert** (1734-1806), a noted financier of the Revolutionary era, born in Liverpool, England. He came to America with his parents in 1747 and settled in Philadelphia. Here he soon secured a position as clerk, and afterward entered into partnership with his employer's son, maintaining the firm until 1793. At the beginning of the Revolution his firm was one of the largest and most prosperous in Philadelphia. Nevertheless, he cast in his lot with the patriot cause at the risk of great financial loss, and was of invaluable assistance in financing the Revolution. He opposed the Stamp Act in 1765, went as a delegate to the Continental Congress in 1775 and signed the Declaration of Independence in 1776. He gave the government the full benefit of his credit. Without his aid the campaign of 1781, resulting in the capture of Yorktown, would have been impossible. In 1781 he was unanimously elected superintendent of finance. He established the Bank of North America in 1781. In 1786 he served in the Pennsylvania Legislature and in the Federal Constitutional Convention the following year. He became a member of the first United States Senate under the new Constitution, serving until 1795. In the latter part of his life he failed in business, due to heavy speculations, and spent several years in a debtor's cell, but was released by the passage of the national bankruptcy law of 1802.

**Morris, William** (1834-1896), an English poet, artist and social reformer, born at Walthamstow, Essex, and educated at Oxford. Upon leaving college, he tried his hand at architecture and painting, until in 1861 he found his true calling. With Rossetti, Burne-Jones and other associates, he then founded a firm in London for the designing and manufacturing of artistic furniture, to which was later added wall paper, stained glass, tapestries and other textiles, dyeing, book

illumination and printing. In 1881 Morris moved his works to Merton, in Surrey, and in 1890 he founded the famous Kelmscott Press at Hammersmith. In the advancement of the lesser arts and for furthering the doctrine that all things should be made beautiful, he accomplished more than any other man of his time. As a poet, Morris retold classic and medieval stories in verse, infusing into his work a marked medieval tone and atmosphere. His collections of poems appear as *Defence of Guenevere, and Other Poems, Life and Death of Jason, The Earthly Paradise, The Story of Sigurd the Volsung and the Fall of the Niblungs* and translations of the *Æneid* and *Odyssey*. He wrote, besides, many romances in prose and verse, including *House of the Wolfings, The Roots of the Mountains, The Well at the World's End, The Story of the Glittering Plain* and *News from Nowhere*. In 1885 he became active as a socialist, lecturing to workingmen and supporting the movement with his pen.

**Morristown, N. J.,** county seat of Morris Co., 30 m. n.e. of New York City and 16 m. w. of Newark, on the Whippany River and on the Delaware, Lackawanna & Western and the Morristown & Erie railroads. The town was settled about 1709 and called West Hanover, but the name was changed in 1740 in honor of Lewis Morris, then colonial governor of New Jersey. The city possesses considerable historic interest as having been twice the headquarters of the American army during the Revolutionary War. From January till May, 1777, and from December, 1779, to June, 1780, Morristown was the seat of Washington's headquarters. The Ford mansion which he occupied, and which has been purchased by the New Jersey State Historical Society, contains a fine collection of relics. Near the center of the town, now marked by a monument, is a steep eminence, the site of Ft. Nonsense, constructed by Washington.

Morristown's scenery and easy access to the near-by large cities make it a most desirable residence place. It is situated in an agricultural region and ships quantities of fruit, flowers and vegetables. At Morris Plains, four miles northeast, is a large state hospital for the insane. The shaft of the *Savannah,* the first steamboat to cross the Atlantic, was cast at the old Speedwell Iron Works. The city's chief manufactures are carriages and strawboard. Population in 1910, 12,507.

**Morse, Samuel Finley Breese** (1791-1872), an American artist and inventor, born at Charlestown, Mass., and educated at Yale College. After graduation he spent some time in England studying painting with Allston and West. He returned to New York in 1815. In 1825 he organized the National Academy of Design and was the first president, holding the position for 16 years. In 1835 he became professor of the arts of design in the University of the City of New York. Previous to this, Morse had become interested in electromagnetism, and on his way home from Europe in 1832 he conceived the idea of the telegraph. Before he had been at the university a year he had a telegraph line half a mile long in successful operation. Having perfected his instruments, in 1837 he applied at Washington for a patent and to Congress for aid in the construction of an experimental line from Washington to Baltimore. But his invention was ridiculed and his application received little attention. He then went to Europe, hoping to interest foreign governments, but without success. Returning to the United States, Morse suffered four years of privation. Finally in 1843 Congress appropriated $30,000 for the construction of a telegraph line from Washington to Baltimore. The line was completed in 1844, and on May 24th the first message, "What hath God wrought?" was sent from the rooms of the Supreme Court in Washington to Baltimore. From that time the success of electromagnetic telegraph was assured.

Professor Morse laid the first submarine electric cable, which was located in New York Harbor, and he likewise

was the first to conceive the idea of the Atlantic cable. No other American inventor has received so many honors as were conferred upon Professor Morse. He received honorary degrees from numerous American universities and was awarded medals and badges of honor by many of the potentates of Europe. See TELEGRAPH.

**Mortgage,** *Mor' gaje,* the transfer of property, either real or personal, as security for the payment of a debt or the performance of a legal obligation. The debtor is called the mortgagor, the creditor, the mortgagee. The conveyance is absolute in form, but it is subject to a proviso by which it is to become void, or by which the pledge is to be reconveyed upon payment to the mortgagee of the debt with interest, at the expiration of the time specified. If this condition is not fulfilled the mortgagee gains absolute ownership at law, but by equity the mortgagor is allowed a limited time in which to redeem the property. In many states the mortgagee's common-law right to take possession by ejectment has been cut off, and he can secure possession of the mortgaged property only through foreclosure, a suit in equity in which he asks the court to deny the mortgagor further time in which to redeem the property. Mortgages can be sold to third parties and property under mortgage can also be sold. When real estate is sold before the mortgage is due the buyer assumes the mortgage and pays the seller the balance of the purchase price.

When several mortgages are given upon the same property they have priority in the order of their creation unless otherwise provided. Courts have always favored the mortgagor's right to redeem, and at any time before the extinction of the mortgage will allow him to compel a cancellation and surrender upon payment of the mortgage indebtedness, with interest, and as an incident to the redemption, will compel the mortgagee to account for any profits which he has received. If personal property or chattels are given as security the mortgage is known as a chattel mortgage. All mortgages must be recorded in the office of the recorder of the county in which the mortgage is given.

**Mor'ton, Julius Sterling** (1832-1902), secretary of agriculture under President Cleveland, born at Adams, N. Y. He graduated at the University of Michigan and studied law in New York City. Having moved to Nebraska, he was elected to the Territorial Legislature in 1856, became territorial secretary in 1858 and acting governor soon afterward. In 1893 he was appointed secretary of agriculture. He was the originator of Arbor Day.

**Morton, Levi Parsons** (1824- ), an American financier and vice-president of the United States, born at Shoreham, Vt. He early became clerk in a country store, and his marked aptitude for business led to his rapid advancement. In 1854 he entered business in New York, and in 1863 founded a banking house there, and another one in London, the latter being the fiscal agent of the United States Government from 1873 to 1884. He served in Congress from 1878 to 1881; was minister to France from 1881 to 1885; was elected vice-president of the United States in 1888 and became governor of New York; in 1895. He exercised great influence upon the financial and political affairs of New York State and the nation.

**Morton, Oliver Perry** (1823-1877), an American statesman, born at Salisbury, Ind. At the age of 15 he was indentured to a hatter. After four years he entered Miami University, then studied law, and began practice in 1847. In 1852 he became circuit judge. He was active in the organization of the Republican Party. In 1860 he became lieutenant-governor of Indiana and succeeded to the governorship the next year. He filled this office throughout the Civil War and was most vigorous in his support of the Union cause, raising and equipping troops, and borrowing money when he could not get the Legislature to act, which sums the state later assumed. He was reelected governor in

1864, and in 1867 entered the United States Senate, where he remained until his death. Morton was an orator of great force, and an able executive.

**Morton, William Thomas Green** (1819-1868), an American dentist, the first to use ether as an anæsthetic, born in Massachusetts and educated in Baltimore. By experimenting on himself, he proved the safety of using ether, and first administered it in his practice in 1846. Dr. Morton patented his discovery in November, 1846; but for it he received no compensation, and Dr. Charles Jackson of England also claimed the discovery at the same time. Litigation to establish his rights to the discovery and patent ruined Dr. Morton financially and professionally.

**Mosaic,** *Mo za' ik,* the name given to the art of making designs in colored stones or glass by taking small pieces and fitting them together in cement, producing a pattern that becomes practically indestructible. This art was practiced extensively during the days of Rome's prosperity, in laying floors, walls and ceilings, and was revived under the Byzantine Empire, especially for churches. During the middle period of the 13th century it came again into Italy, where it has continued to be practiced. The shops connected with the Vatican employ constantly a number of workmen who are engaged in reproducing pictures of world-renowned artists in mosaic, using glass and artificial stones, prepared especially and tinted to suit the required shades. The Russians have become proficient in modern mosaic work. Florentine mosaic is employed chiefly in jewelry, personal ornaments and paper weights, and is composed of stones or shells in their natural colors cut in much larger pieces than Roman mosaics. The Americans have produced some of the finest designs in their public buildings, notably at Washington, D. C. The demand for mosaic work for floors, ceilings and walls in America continues to increase, and, no doubt, as the skill becomes greater the art will be brought to perfection.

**Mosby,** *Moze' by,* **John Singleton** (1833- ), an American Confederate soldier, born in Powhatan County, Va. He studied at the University of Virginia, but was dismissed for shooting and wounding a fellow student. He was admitted to the bar and practiced law in Bristol, Va. In 1861 he entered the Confederate army under Joseph E Johnston. During most of the war, however, he served at the head of a guerilla band of partisan rangers that harassed the Union troops by devastating raids. President Hayes appointed him consul at Hongkong in 1878, where he remained for six years. Later he settled in Washington, where he engaged in government work. He published a volume of *War Reminiscences.*

**Moscow,** *Mos' ko,* the second capital of the Russian Empire, the principal town of the government of the same name, situated on both banks of the Moskva River, 400 m. by rail s.e. of St. Petersburg. Covering an area of about 40 sq. m., the suburbs inclusive, the city presents a varied appearance, with its busy squares of traffic, manufacturing quarters, the adjoining villages and the homes with the spacious courtyards where live the nobility. The Kremlin, an old fort surrounded by a wall having 19 towers and five gates, includes many sacred buildings, chief of which are the Uspenskiy Cathedral, containing holy and venerated pictures, relics of saints and the throne of Vladimir I. Various old cathedrals, churches, monasteries and convents are also found near by. Other buildings of prominence are the palace of the czars, built of white stone with a gilded cupola, the senate house, the arsenal, the university founded in 1755, museums, a picture gallery and several libraries.

Moscow is the chief manufacturing city of the empire, employing nearly 50,000 laborers in the textile industries. of which calico printing is the principal one, and fully as many more in the other mills and factories. The city also contains factories for preparing foodstuffs, and chemical, metal and metallurgical

works. Commercially Moscow has been of great importance since the 14th century. Here is carried on an extensive traffic in hemp, oils, grain, sugar, wool, metals, skins, tallow, timber, silk and raw cotton.

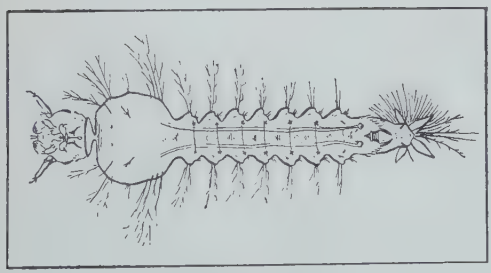
The first mention of Moscow is in 1147, though a settlement on the site dates back to a remoter antiquity. In 1703 the young Peter the Great, meeting with violent opposition to his plans, removed to St. Petersburg to found there a new capital. Napoleon occupied the Kremlin in 1812, and repeated attempts to remove him resulted in a burning of the city through carelessness of the inhabitants, and a general pillaging of all quarters by the French. Population in 1907, including the suburbs, estimated at 1,359,250.

**Mo'ses,** the great Hebrew lawgiver, prophet and leader, born in Egypt, when the Israelites were in bondage to the Egyptians. He was the son of Amram and Jochebed. When he was three months old his mother put the child in a basket made of bulrushes and left him on the river bank, trying thus to save him from the cruel edict of Pharaoh, that every male child of the Hebrews should be slain at birth. He was found here by a daughter of the King, who adopted him, named him Moses and had him educated. After he had grown to manhood, having incurred the anger of Pharaoh, he fled to the land of Midian, married there the daughter of Jethro, a priest, and settled down to the life of a shepherd. It was at this period of his career that Moses heard the call of Jehovah to deliver the Israelites from their bondage, and in due time he returned to Egypt to fulfill his mission. He was now 80 years of age. It was only after the land had been visited by ten horrible plagues that Pharaoh permitted the Children of Israel, under the leadership of Moses, to depart, and he afterwards pursued them with his army to the Red Sea, over which the Israelites passed as on dry land. The strong east wind which divided the waters for the Hebrews, however, did not aid the pursuers, who were all drowned when the waters came together. The 15th chapter of *Exodus* contains the beautiful song of Moses and his sister Miriam, their offering of praise for the deliverance of the people.

Moses was now confronted by the tremendous problem of guiding the host of the Israelites through the wilderness to the Promised Land of Canaan. Not only did he take them to the borders of that country, but he gave them their institutions, both political and religious. While they were encamped on Mt. Sinai he announced to them the Ten Commandments, the basis of Israelitish law. The people were 40 years in the wilderness, but it was the successor of Moses, Joshua, who led them finally into Canaan, for Moses was not permitted to enter therein because of his lack of faith when the people murmured for water in the Desert of Zin (*Num. xx*). When his work was finished he ascended Mt. Pisgah, overlooking the new country his people were to inhabit, and there he died, at the age of 120 years. The Bible records in simple and beautiful language his burial in an unknown grave in the land of Moab.

**Mosquito,** *Mos ke' to,* an annoying and dangerous insect of the Gnat Family and a member of the same order as the flies. It is a small two-winged insect, with segmented abdomen and long, slender legs. The male is easily distinguished by the presence of two or four plumelike antennæ. The female is larger, has one pair of threadlike antennæ and is our chief source of annoyance, for she it is that bears the sting. The eggs of the mosquito are laid in raftlike colonies upon the surface of standing water, and there, in about 16 hours, they hatch into lively, wriggling larvæ, which issue from the underside of the egg mass and seem never quiet. In this state they are known as wrigglers, and may be found in almost any bit of standing water, from that in a vase of flowers in the house, or the discarded cans in the rubbish heap, to the ponds of roadside and woods.

The wriggler has a large head, swollen thorax and slender abdomen. The body is edged with stiff bristles and the filaments about the mouth are in constant vibration. Peculiarly enough the breathing tube extends from the posterior extremity of the body, and it is nearly as thick as the body itself. When its air supply is exhausted, the wriggler ascends by means of a series of rapid jerks, and thrusts its breathing tube above the surface, holding its body at an angle of about 45°. After filling its air sacs, it withdraws the tube and descends by the same curious, jerky movement. After about seven days of existence, the larva is transformed into a peculiar, big-headed pupa, lighter than water, so that it must exert violent muscular action in order to sink beneath the surface. It is, however, as active in this state as in the larval form, and its only means of defense against its numerous enemies is its quickness. Two days suffice to bring the pupa to maturity, and then it loses its aquatic habits and becomes the familiar mosquito. A period of cold weather lengthens the pupal

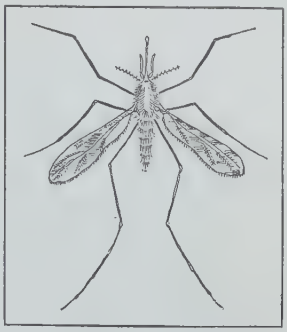


MOSQUITO LARVA

stage, but under ordinary conditions ten or twelve generations of mosquitoes may hatch in a single season.

The proboscis of the mosquito is a fine, needlelike sword, borne only by the female, who is notoriously bloodthirsty. She pierces the flesh to a blood vessel and draws blood therefrom until her abdomen is distended almost to bursting. Contrary to popular belief, however, she does not gorge herself until death ends her feast, but lives to enjoy many another banquet at our expense. The poison of the bite is the effect of a liquid which is probably injected to hasten the flow of the blood. Many persons become so inoculated against this poison that the bite of a mosquito produces no swelling whatever.

MOSQUITO



DISEASE BEARING MOSQUITO

The common mosquitoes belong to the genus Culex, of which there are several species, all comparatively harmless. Very different, however, are the species of Anopheles, which carry malaria and yellow fever germs and, in consequence, should be recognized and exterminated. The adult may be distinguished from its harmless cousin by the position of the body when at rest; that of the Anopheles is held at an angle of from 20° to 45°, while the body of the Culex is practically horizontal, and its head is held so low that it has a humpbacked appearance. The life of an Anopheles from egg through adult is about 16 days.

In 1882 it was suggested by Dr. King of Washington that the Anopheles mosquito might be the carrier of malarial germs. His theory was not conclusively proven until some years later, when investigators in various parts of the world almost simultaneously demonstrated the fact beyond doubt. The malarial parasite is a Protozoan, that is, an animal and not a plant, which lives and grows in the red corpuscles of the human blood. Here, as it matures, spores are formed which continue to grow and form new germs, or die and are eaten by the white corpuscles unless the blood is too badly diseased. If blood containing these parasites is removed from the human body, the germs at once begin a new develop-

ment, which is carried out to its full extent only in the stomach of the Anopheles mosquito. Here they form large cells, known as zygotes, which burst and set free numberless active, spindle-shaped cells that penetrate the walls of the salivary and poison glands, and are thus ready to be injected into the body of the next victim of the mosquito's lust for blood.

In its larval stage the mosquito is rather easily destroyed. A coating of oil over any body of water prevents the wriggler from protruding its breathing tube, and without this means of procuring air it is soon suffocated. Any small receptacles of standing water should be emptied, cisterns and rain barrels should be covered, and all ponds or even mud puddles of long standing should be treated with kerosene. The oil may be applied by pouring or by spraying, and only a thin film is necessary if it is spread evenly. Burning pyrethrum powder in a room kills or stupefies all insects; after which they should be swept up and burned. Many localities in the United States have entirely rid themselves of these pests by vigilant treatment, and there is no reason why the death-bringing mosquito, along with the equally harmful fly, should not be exterminated.

**Mosquito Territory,** or **Mosquito Reserve,** a coastal region of Nicaragua bordering upon the Caribbean Sea. It has been set apart for the Mosquito, or Misskito, Indians by the governments of the United States, Great Britain and Nicaragua, but became voluntarily a part of Nicaragua in 1894. The soil is rich and watered by many rivers, chief among which is one called the Rio Grande. Mahogany, dyewoods and drugs are the most valuable exports. The climate is moist and not healthful. Bluefields, or Blewfields, in the southeastern part, is the most important town of the Reserve.

**Moss,** a name applied to a large class of flowerless plants, allied to the liverworts and, with them, technically known as Bryophytes. The mosses are so different in external appearance and habits and so unlike in name in diverse localities, that they are often hard to identify. In general they are green-stemmed plants, bearing tiny leaflike structures which conceal at their bases little, swollen stalks, carrying the spores that take the place of seeds. Their life history presents a manner of growth known to botanists as alternation of generations, which means that the plant lives in at least two forms, each of which produces, not its own form of life, but the other. The spores, which form upon the leafy stalks, fall to the ground and germinate, putting forth long, matted branches in the soil or in decaying logs of moist, shaded woodlands. In time these stems develop buds which grow out into the air in leafy plants with rootlike attachment to the soil. This is the first part of the life of the moss plant. Later the leafy stalks produce two kinds of organisms which act very much like the stamens and pistil of flowering plants. One bears a second form of spore, which, falling upon the pistil-like organ, causes it to develop a box whose lid breaks open disclosing spores of the first sort mentioned. This is the second generation of the plant.

The mosses are decorative, and their thickly growing stems of light green, dark green or gray, carpet decaying woods, rocks and unsightly pondsides until they are rendered softly beautiful. Moss leaflets have great absorbing power and are capable of holding so much water that it can be wrung from them as from sponges; thus they can stand great drought, and their stems may dry until, if touched, they fall in powder, and yet, if moistened, will return to their former activity.

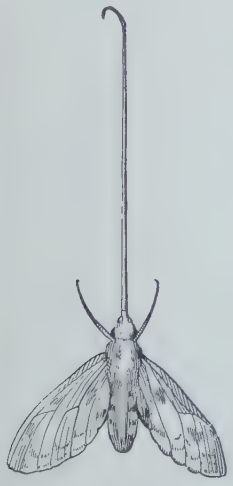
Mosses are of great economic use in preparing the soil for the growth of other plants, as they not only form a bedding in which other seeds may take root, but the acid formed in their roots helps to wear away rocks. Sphagnum moss produces the great peat beds, a source of fuel; others are used for bedding and packing material; and some are

sources of dyes, mucilage and certain medicines.

Our commonest mosses are known by various names; probably pixie-cup, haircap, canary, and hanging mosses are the most familiar, and any shaded grove is apt to present several forms of these.

CECROPIA MOTH

**Moth,** one of the three general divisions of the order Lepidoptera, the other two being the skippers and the butterflies. Moths, or millers, as they are frequently termed, generally fly by night and are attracted by lights, often to their own destruction. They may be distinguished from the butterflies, which fly by day, by their antennæ, which, though various in form, are generally threadlike and are never terminated by a knob. The wings, when spread, are horizontal rather than at an angle with the body, and when at rest are either folded about the body or left outspread. The moths include six families of the order, and many are harmful to vegetation and to woolens. Others are carnivorous and seek the tinier insects that cross their path; still others feed only upon honey and the sweet sap of trees. Their appetites vary greatly, according to their stage of development. See CATERPILLAR; LEPIDOPTERA; HAWK MOTH; DEATH'S-HEAD MOTH; CODLING MOTH.



HONEY-FEEDING MOTH

**Mother Carey's, *Ka' riz,* Chicken.** See PET'REL, subhead *Stormy Petrel.*

**Mother-of-Pearl,** the brilliant, iridescent, sheenlike material which certain Mollusks, particularly those of the Oyster Family, produce in hard layers in the interior of their shells. The colors are usually a creamy white, variegated with purple, azure and pink. Mother-of-pearl is used in the arts quite extensively, particularly in making buttons and knife handles, and also in the ornamentation of papier-mâché work, lacquer ware, etc., by inlaying the articles with fragments of shells containing this beautiful material. See PEARL.

**Mothers, the National Congress of,** an organization founded in Washington, D. C., in 1897, by Mrs. Theodore W. Birney and Mrs. Phoebe W. Hearst. The chief objects of the organization are: to raise the standards of home life; to give young people the opportunity of learning how to care for children; to bring the home and school into closer relationship; to further in every way the various agencies that work for developing good citizens and to secure more adequate laws for the care of dependent children. Among the various departments of the organization are those of education, children's literature, child hygiene, Juvenile Court and probation, child labor, parent-teacher associations, child welfare legislation, playgrounds and home economics. Annual meetings are held in large cities of the United States, and since the founding of the society two International Congresses on Child Welfare have been convened, in 1905 and 1911 respectively. Every person interested in promoting the welfare of children is eligible to membership. The headquarters of the association are in Washington, D. C.

**Mo'tion, Laws of,** the three general principles in accordance with which all the phenomena of motion take place. They were first clearly stated by Sir Isaac Newton in 1686.

FIRST LAW. *A Body at rest continues at rest unless acted on by some external*

*force and a body in motion continues in motion with uniform speed in a straight line unless acted on by some external force.* Thus a moving railroad train, when the power of the engine is shut off, continues to move until the external forces of friction bring it to a stop; if there were no friction, it would continue to move at the same speed as before. When moving at a constant speed, the entire force exerted by the engine is just enough to overcome the retarding forces of friction.

Second Law. *Change of momentum of a body is proportional to the force acting and to the time during which it acts, and this change of motion (more accurately, momentum) takes place in the same direction as the force causing it.* Momentum is the product of the mass (commonly, but incorrectly, called weight) of a body by its velocity. If one pushes for a few seconds a heavy wagon on a smooth pavement, the velocity produced is small. The same force applied for the same length of time to a light wagon would produce a greater velocity. The momentum produced in the heavy wagon, the product of its large mass by its small velocity, is equal to the momentum produced in the light wagon, the product of a smaller mass by a greater velocity. If the force is exerted for a greater length of time, a proportionately greater momentum will be produced in each case. Again, when a ball is thrown horizontally, it is continually pulled out of a straight line by the force of gravity, and its change of motion takes place in the direction gravity acts, that is, downward.

Third Law. *To every action there is an equal and opposite reaction.* If a freely suspended gun be fired, the expanding powder gases push back on the gun as hard as they push forward on the bullet, and it will be found that the gun and the bullet have acquired equal (and oppositely directed) momenta.

**Mot'ley, John Lothrop** (1814-1877), an American historian, born at Dorchester, Mass., and educated at Harvard University and at Göttingen and Berlin. Later he traveled in southern Europe. Returning to America, he studied law and in 1837 was admitted to the bar. His preference, however, was for literature, and his first publication, barring contributions to magazines, was a novel entitled *Morton's Hope.* This had slight success, as did its successor, *Merry-Mount.* He was ambassador to Vienna from 1861 to 1867, and minister to London from 1869 to 1870. Motley is noted chiefly for his *Rise of the Dutch Republic,* which he published in 1856 and which was translated into French, Dutch and German, securing him high honors in Europe and America; and for *History of the United Netherlands* and *The Life of John Barneveld.* The latter was published in 1874. Motley takes rank with the most eminent of American historians. His work is characterized by vividness, and shows an intense love for the spirit of liberty.

**Motor Cycle,** a self-propelling bicycle. In general plan the motor cycle closely resembles the bicycle, but it is made heavier to sustain the weight of the motor and the strain caused by the speed at which it can be driven. The motor is a gasoline engine usually of three-horsepower. The controlling apparatus is attached to the handle bars, and a brake enables the operator to stop the motor cycle almost instantly. Many motor cycles have two seats arranged tandem. The motor cycle is a practical road machine, and on good roads will easily carry two passengers from 80 to 100 m. a day. Some patterns are built for racing, and under favorable circumstances a speed of 100 m. an hour has been attained with them for distances.

**Mo'tor Generator,** *Jen' er a" tor,* a combined electric motor and dynamo. In its simplest form for direct-current work it consists of two armatures mounted on the same shaft and revolving in separate magnetic fields. The motor armature and the fields receive current at one voltage and the dynamo armature delivers current (and sometimes excites its own field) at a very different voltage from that of the sup-

ply. Such machines are used when it is desired to get very heavy currents at a low potential, five to ten volts, for electroplating or other special work, from a source of current at 110 or 220 volts.

The machine is frequently made with two armature windings on the same core and revolving in a common magnetic field, the shaft, of course, carrying two commutators, one for each armature winding, as for the separate armatures. Such a machine, because of its simpler construction, is less expensive and more efficient than one of the type first described, but it is not capable of regulation of the voltage of the dynamo side.

Rotary Converter. This differs from the preceding machine in having one of its armature windings designed for alternating current and connected to collector rings instead of a commutator. Such a machine can be used for converting alternating current into direct current or the reverse; hence the name rotary converter. Machines of this type are widely used in electric-power transmission systems. The electric power is carried long distances in the form of alternating current at high potential, 13,000 to 60,000 volts, to the substation where it is transformed to alternating current at a moderate potential, 350 to 500 volts. It is then led into the alternating-current side of the rotary converter, and direct current at a potential of 500 to 600 volts is delivered from the direct-current side of the converter. In this case the magnetic field is excited by direct current from the direct-current side of the converter. The direct current delivered is led to the local-distributing system, as the trolley and rails of a street railway, or to wire for supplying direct current for various other purposes. See Dynamo; Electric Motor; Electric Railway.

**Mott, John R.** (1865- ), Christian leader, lecturer and author, born at Livingston Manor, N. Y. Mr. Mott graduated from Cornell University in 1888, since which time he has been student secretary of the International Y. M. C. A. and also chairman of the executive committee of the Student Volunteer Movement. Since 1895 he has been general secretary of the World's Christian Student Federation, and since 1898, foreign secretary of the International Committee of the Y. M. C. A. Since 1901 he has been associate general secretary of the International Committee of the Y. M. C. A., and in 1910 he was the presiding leader of the World's Missionary Movement in Edinburgh. Mr. Mott is a man of remarkable executive ability and of most marvelous power as a leader of men. He has been recognized by various institutions of learning, receiving numerous honorary degrees. He is a member of the Phi Beta Kappa and a fellow of the Royal Geographical Society. In conferring the degree of doctor of laws upon Mr. Mott, Princeton characterized him as "a new crusader bent on the Christian conquest of the world."

**Moulton,** *Mol' tun,* **Ellen Louise** (1835-1908), an American poet, born in Pomfret, Conn. She studied at Troy, N. Y., edited and published works before she was 20, and in 1855 married William Moulton, a Boston journalist and publisher. Her works include *Juno Clifford, a Tale; Bedtime Stories, Random Rambles, Stories Told by Twilight* and *At the Wind's Will.*

**Moultrie,** *Mol' try,* **William** (1731-1805), an American soldier, born in Charleston, S. C. He was the son of a physician and received an ordinary education. He fought against the Cherokee Indians and, though bound by many ties to the Loyalists, he espoused the cause of the colonists. In 1775 he sat in the first South Carolina Provincial Congress and also commanded a regiment of state militia. In March, 1776, he defended Charleston against Clinton, and he was thanked by Congress for repulsing the British fleet under Parker. Moreover, the fort of palmetto logs, which he had thrown up on Sullivan's Island for the protection of the city, was named for him. In September of the same year he became brigadier-gen-

eral, and was given command of the departments of Georgia and South Carolina. He actively defended this territory, finally entering Charleston, where he commanded until the arrival of General Lincoln. He was taken prisoner at the capitulation of the city, 1780; but with several others was exchanged for Burgoyne in February, 1782. In October following he was commissioned a major-general. He was governor of South Carolina in 1785 and again in 1794.

**Mound Bird.** See BRUSH TURKEY.

**Mound Builders,** the name given to a race which once inhabited the Western Hemisphere. Their name refers to the immense mounds which they built as fortifications, memorials or burial places. Thousands of these mounds are found in the valleys of the Mississippi and Ohio rivers, and upon being opened are found to contain bones, trinkets and other remains of an ancient civilization. The mounds differ greatly in shape and many are seen to bear a rude resemblance to animals, human figures and geometrical designs. The "Serpent Mound" of Ohio is probably the best known; it is 1300 ft. in length and has serpentlike curves, head and tail. In the open mouth is a circular mound supposed to represent a serpent's egg. It is a disputed question whether or not the Indians are descendants of the mound builders.

**Moundsville, W. Va.,** a city and the county seat of Marshall Co., 11 m. s. of Wheeling, on the Ohio River and on the Baltimore & Ohio Railroad. The city occupies a point of land about a mile in width at the junction of the Big and Little Grave creeks. The chief factory products are glass, enameled ware, brick, lumber products, leather, flour, feed, foundry products and grain cradles. Here is located the state penitentiary. A fine courthouse is one of the attractions of the city. The most distinctive feature of Moundsville, however, is a giant earth mound in the vicinity, 70 ft. in height and 320 ft. in diameter at the base, one of the largest monuments of the American mound builders, whence the city's name (See MOUND BUILDERS). The first settlement here, which was called Elizabethtown, was made in 1798. It was incorporated in 1830. In 1831 the town of Moundsville was laid out about one-half mile distant (incorporated in 1832). In 1866 the two towns were consolidated and called Moundsville. Population in 1910, 8918.

**Mountain Ash,** or **Rowan,** *Ro' an,* **Tree,** a beautiful tree of the Rose Family, well known throughout Europe and America. It is a trim, stately tree with crisp, green leaves, made up of many finely-toothed leaflets, and clusters of many white flowers. The branches are slender and, near the leaves, are reddish-brown in color. The fruit is a cluster of bright red berries, beautiful to the sight but bitter to the taste. These berries remain on the tree until well along in the winter, and when capped with snow have a picturesque appearance. The American mountain ash grows wild in Northern woods, and there may be either a low shrub or a slender tree. Farther south it is found often under cultivation. In the British Isles it is called the rowan tree, and many quaint superstitions center about it.

**Mountain Cork,** a variety of asbestos obtained from Sall Mountain, Georgia. It has the elasticity of cork, and is usually white or grayish-white in color. See ASBESTOS.

**Mountain Laurel.** See KALMIA.

**Mountain Lion.** See PUMA.

**Mount Carmel, Pa.,** a city of Northumberland Co., 45 m. n.e. of Harrisburg and 6 m. e. of Shamokin, on the Northern Central, the Philadelphia & Reading and the Lehigh Valley railroads. It is situated in a mountainous region in the midst of valuable coal fields, and near by are extensive anthracite mines. The manufactures include flour, lumber, mining implements, miners' lamps, men's clothing and all kinds of miners' supplies. Population in 1910, 17,532.

**Mount Clemens, Mich.,** a city and the county seat of Macomb Co., 22 m. n.e. of Detroit at the head of navigation on

the Clinton River, about 5 m. from its entrance into Lake St. Clair, and on the Grand Trunk and other railroads. Electric lines connect the city with all near-by towns. The city has manufactories of beet sugar, wagons, carriages, sleighs, caskets, agricultural implements and cooperage products. The place is beautifully situated and is noted for its medicinal mineral waters, which are used in the treatment of various diseases. Large sanatoriums, bathing houses and hotels have been built to accommodate the thousands of annual visitors. The city has a Chamber of Commerce and a public library. Settled in 1802, it was first incorporated in 1878. Population in 1910, 7707.

**Mount Holyoke,** *Hole' yoke,* **College.** See WOMEN, COLLEGES FOR.

**Mount Stephen, Sir George Stephen** (1829- ), a capitalist, born in Banffshire, Scotland, and educated at Aberdeen University. In 1850 he came to Canada, where he later entered largely into manufacturing woolen goods, became president of the Bank of Montreal, joined the railroad syndicate that eventually controlled all the traffic of the Canadian Northwest, and associated himself with the company that in 1880 undertook to construct the Canadian Pacific. In 1891 he was raised to the peerage, with the title of Lord Mount Stephen. This name was taken from the peak named for him, on the Canadian Pacific, of which he was president. Previously, in 1888, he had returned to England to live.

**Mount Ver'non,** the home and burial place of George Washington, in Fairfax County, Va., 15 m. s. of Washington, D. C. When Washington's elder brother, Lawrence, acquired the estate, he called it Mt. Vernon in honor of Admiral Vernon, under whom he had served in the British navy. The Washington mansion, situated on a high bluff overlooking the Potomac, was built by him in 1743. It is of wood, two stories high, 96 ft. long by 32 ft. deep, with a high piazza extending across the front. In 1752, at the death of his brother, the estate came into possession of George Washington. The house and 200 acres surrounding it were purchased in 1859 by the Mt. Vernon Ladies' Association, which had it restored, as nearly as possible, to what it was in Washington's time. The six rooms on the ground floor, in one of which Washington died, contain many articles of historical interest; in the garden are trees planted by Washington's hand, and in the coachhouse may be seen his carriage. Near by is the simple brick tomb to which, in 1831, his body was removed from the old family vault. Here, behind an iron grating, may be seen the sarcophagi containing the remains of George and of Martha Washington.

**Mount Vernon, Ill.,** a city and county seat of Jefferson Co., 76 m. s.e. of St. Louis, Mo., and about 115 m. s.e. of Springfield, on the Wabash, the Chicago & Eastern Illinois, the Louisville & Nashville and other railroads. The chief industries are farming and coal mining. Among the manufactured products are railroad cars, axe handles, flour, lumber and machinery supplies. The town contains a tie-preserving plant, a large grain elevator, marble works and a Supreme Court Building. Settled about 1819, it was incorporated in 1872. Population in 1910, 8007.

**Mount Vernon, N. Y.,** a city of Westchester Co., 13 m. from the Grand Central Station in New York, on the Bronx River and Eastchester Creek, an arm of Long Island Sound, and on the Harlem Division of the New York Central & Hudson River, the New York, New Haven & Hartford and the New York, Westchester & Boston railroads. Electric railways connect the city with New Rochelle, Yonkers, New York and the intervening towns and cities. Mount Vernon is primarily a residential suburb of New York. Chester Hill, in the northeastern section, contains many costly residences. The streets and boulevards are broad and well kept and the sweep of lawn and garden makes the city most attractive. The elevated portions command wide views of Long Is-

land Sound. Mount Vernon contains a city hospital, a public library, fine school buildings and 37 churches. There are about 50 varied industries. Mount Vernon was founded in 1851 by a number of realty companies. The place was incorporated as a village in 1853 and chartered as a city in 1892. Population in 1910, 30,919.

**Mount Vernon, Ohio,** a city and county seat of Knox Co., 45 m. n.e. of Columbus and 85 m. s.w. of Cleveland, on the Kokosing River and on the Cleveland, Akron & Columbus and the Baltimore & Ohio railroads. It is situated in a fertile agricultural region and near the natural gas and oil belt. The river affords ample water power for manufacturing purposes. The city has considerable trade in farm and dairy products. The principal industrial establishments include the extensive plant of the Corliss engine works, locomotive shops, foundries, lumber and flour mills, cooperage works, sash and blind shops, bridge and bent-wood works, sawmills and furniture factories. The city contains a public library, good schools and municipal buildings, and Hiawatha Park, with a picturesque lake. Population in 1910, 9087.

**Mourning Dove,** or **Turtle Dove,** a bird of the Pigeon Family. It is larger than the robin (13 inches) and is grayish-brown above, with part of the wings black-spotted; the under parts are pinkish-brown; the tail feathers are lead-colored with a black band across the middle, and all but the two middle feathers are white-tipped. There is a black spot below each ear and an iridescent spot on the side of the neck. The nest is simply a platform of twigs placed on a branch from 10 to 50 ft. above the ground or occasionally placed on the ground. Two white eggs are laid. The mourning dove ranges throughout North America from British Columbia to Panama. It is common in orchards, fields and along railroads, and in the fall collects in flocks of considerable size.

**Mouse,** the name of a genus of Rodents of the Rat Family best known through its representative the house mouse. It has smooth fur which is generally dark-colored, a long, hairless tail, pointed ears and bright, beady eyes. It is very destructive and is hard to exterminate, since it is shy and works only by night. It gnaws its way through partitions and runs up vertical walls to secure food, which it locates by means of its keen scent. The field mouse and harvest mouse are other specimens of the same genus which live in the field and make their homes in small burrows in meadow or cornfield in the winter, or swing their nests from the top of cornstalks in the summer. Members of these classes are easily tamed, and some domesticated species are sold as pets.

The jumping mouse, or kangaroo rat, is a member of the Jerboa Family.

**Mouth,** the opening into the alimentary canal. It is bounded in front by the lips, on the sides by the cheeks, below by the tongue and above by the palate. The hard palate forms the roof of the mouth and also the partition between the mouth and the nose. Back of the hard palate is the soft palate. The mouth is connected with the pharynx by the passage known as the isthmus of the fauces, on each side of which are the tonsils.

**Moving Pictures,** pictures produced by an instrument which projects in rapid succession, views of successive phases of a moving object so as to represent action in real life. The projecting apparatus is a form of stereopticon, originally called the cinematograph, and having a strong objective or projecting lens and a reel on which the film containing the pictures is wound. A strong, steady light is necessary to the production of clear pictures.

The photographs are taken by a camera made especially for this purpose. The camera has a reel for holding a sensitized film, similar to that on the projecting instrument. The camera is set so as to cover the field in which the object moves. Then the sensitized film passes across the lens, stopping for a fraction of a second, while the shutter opens and closes for the exposure, the

photograph being instantaneous, when the film is moved forward for the next exposure. So rapidly is this done that several exposures can be made in a second. When the picture is completed, the ribbon of film is developed, and from the negatives thus formed positives are made on another ribbon of the same size. This ribbon forms what is called the "film." The pictures on this film are passed across the field of the projecting lantern in the same order and with practically the same speed with which the ribbon on which the negatives were taken was passed through the camera. The result is the reproduction of the scene in a remarkably lifelike manner.

For an hour's exhibition 50,000 to 165,000 pictures are required. The pictures ordinarily produced are in black and white. Those in colors are painted by hand, which is tedious and expensive. Attempts have been made to use color photography, but so far without practical results. Moving, living or animated pictures of such objects as automobiles racing, an express train at full speed, horses and fire apparatus going to fires and soldiers marching are presented with marvelous accuracy. The cinematograph combined with the phonograph for giving the representation of songs and dances furnishes an interesting entertainment. Owing to the great inflammability of the celluloid film, great precautions must be taken in operating the cinematograph so as not to bring the film too near the light and set it on fire.

Thomas A. Edison has invented an apparatus which he calls the kinetophone, which is a talking moving-picture machine. By means of the kinetophone the sounds which one would expect to accompany the actions are heard. Men speak, dogs bark, musicians play upon the instruments. The sounds are articulate but somewhat metallic. This apparatus consists of a combination of the phonograph and the cinematograph, the instruments being so adjusted that they work in harmony.

Moving pictures are of great educational and commercial value. In the best-equipped schools they are now used in teaching geography and history and for illustrating the methods of manufacture employed in some of our great industries. Commercially they constitute a valuable advertising device. It is estimated that over $500,000 is paid daily in the United States to see moving-picture shows. The industry represents an investment of over $200,000,000, and each day over 5,000,000 people attend these shows. More than five miles of film are produced daily to meet the demands of exhibitors.

**Mowing Machine,** a machine for cutting grass. It consists of a frame, drive wheels, gearing, cutting apparatus and attachments for hauling the machine. A toothed wheel is attached to the shaft, to which the drive wheels are also attached. This wheel meshes into a small one at right angles to it and attached to a shaft, at the opposite end of which is a pitman, which gives a reciprocating motion to the knives. These are triangular pieces of steel, with opposite sides sharpened. They are attached to a horizontal steel bar and move in slots in fingerlike guards. As the machine is drawn forward, the knives are given a rapid motion, and cut the grass as it is forced up against the guards. The ordinary mowing machine is hauled by two horses and cuts a swath about four feet wide. See REAPING MACHINE.

**Mozambique,** *Mo" zam beek'*, **Channel,** a passage between the eastern coast of Africa and the Island of Madagascar. It is over 1000 m. long, and its breadth varies from 250 to 600 m. The Comoro Islands are in its northern part.

**Mo'zart, Wolfgang Amadeus** (1756-1791), the celebrated German composer, was born at Salzburg, the son of a violinist of high repute. He was educated with great care, and in early childhood displayed a precocity beyond anything that had ever been known. With his sister, who was five years his senior, he was taken when six years of age to the Austrian court, where his performances excited wonder. The follow-

ing year he published several sonatas and other works, and in 1764 went to England, and was enthusiastically received. When only 13 years old he was made master of concerts of the court orchestra of Salzburg, and the next year his father took him to Italy for further study. During this sojourn he accomplished a marvelous feat in transcribing from memory some difficult music of the Sistine Chapel, Rome, after a single hearing. The Pope decorated him with the Order of the Golden Spur, and he was admitted to membership in the Philharmonic Academy of Bologna, in spite of the rule denying membership to candidates under 20 years of age.

From this time Mozart produced sonatas, symphonies, concertos, masses, with astonishing rapidity. In 1781 he removed to Vienna. While at the Austrian capital some of his greatest masterpieces were written, among them the opera *Idomeneo,* which placed him among the greatest musicians of the world. Many honors were at this time conferred upon him, and the King of Prussia allowed him a comfortable yearly income. In 1782 he was married to Constance Weber, a great-niece of the composer Weber. During the years that followed the most of his operas were written.

Mozart was a man of stupendous intellect, sound scholarship and a wealth of musical ideas. His melodies flowed from an exhaustless fountain; the more he gave, the more inventive he became. And in every period of his development his works were marked by an originality and fluency that give to this composer a unique place among the half dozen supreme geniuses of his profession. The following are among his greatest works: *Mithridates, The Clemency of Titus, The Marriage of Figaro, The Magic Flute, Don Giovanni* and the famous *Requiem Mass.*

**Mucilage,** *Mu' si laje,* a solution of the gum of certain plants in water. When gum arabic is dissolved in hot water, a paste is formed which can be kept from molding by the addition of a few drops of carbolic acid. This is an excellent mucilage and can be easily made by any one. See Gum Arabic.

**Mud Hen.** See Coot.

**Mud Puppy,** or **Hellbender,** an American lake salamander of the Proteid Family. It differs from other salamanders in retaining through life the gills of its larva stage, thus being more nearly related to the fishes than are other Amphibians. The mud puppy is dark brown in color, often marked with lighter spots. It is sometimes called mud eel or water dog.

**Mug'wump",** an Indian word signifying one of superior wisdom or of exaggerated importance. In 1884 the term was applied in derision to those members of the Republican Party who refused to vote for James G. Blaine for president. Those to whom the term was applied adopted it as a mark of honor, and later it was applied to those who did not hesitate to vote independently.

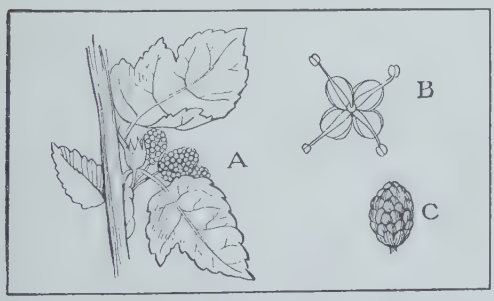
**Muhlenberg,** *Mu' len burg,* **Frederick Augustus Conrad** (1750-1801), an American politician, son of Heinrich Muhlenberg, founder of Lutheranism in America. He was born in Montgomery County, Pa., and studied in Germany, then became pastor of an influential Lutheran church in New York City. In 1776 he returned to Pennsylvania, where he entered actively into Revolutionary movements. He belonged to the Pennsylvania Assembly, was president of the convention that ratified the Federal Constitution and was speaker of the first House of Representatives. As chairman of the committee of the whole, his casting vote carried Jay's Treaty.

**Muir,** *Mure,* **John** (1838-1914), an American geologist, explorer and naturalist, born in Dunbar, Scotland, and educated in Scotland and at the University of Wisconsin. He discovered the Muir Glacier, Alaska, visited the Arctic on the *Corwin* in search of the De Long expedition, and actively engaged in the cause of forest preservation and the establishment of national reservations and parks. Muir traveled throughout the world. He was a prolific writer and the Editor of *Picturesque California.*

**Muir Glacier,** one of the largest glaciers of Alaska, named for its discoverer, John Muir. It is situated on the west coast of Alaska at the head of Glacier Bay, upon which it has practically a three-mile frontage. It covers an area of 350 sq. m. and drains an area estimated to be more than 800 sq. m. in extent. The front takes the form of a vertical, overhanging cliff, from which icebergs are constantly falling into the sea. See GLACIER.

**Mukden,** *Mook" den',* a town of China, capital of Manchuria, situated on the Hunho, about 400 n.e. of Peking. Within the second wall of the city stands the palace roofed with yellow tiles. Here also are the government offices and other prominent buildings; and tombs of the early rulers of the city rise to the east. During the Russo-Japanese War Mukden was the scene of some important engagements (See RUSSO-JAPANESE WAR). Population, 250,000.

**Mul'berry,** the name of a number of trees and shrubs of the Mulberry Family, valuable as shade and fruit trees; one species, the white mulberry, is raised abundantly for its leaves, which form the chief food of silkworms. The mulberry is widely distributed in warm or temperate climates, and two species are




MULBERRY

A. Branch and Fruit. B. Flower enlarged. C. Fruit.

native in the United States. The tree has a short trunk, with wrinkled bark; the foliage is thick, and, as the tree grows rapidly, lawns set out to mulberries are soon well shaded. The shiny, light green leaves are slightly lobed, and are sharply-toothed at the margins. The flowers are rather fragrant but inconspicuous, and are followed by a sweet, red or purple, compound fruit, somewhat resembling the blackberry. The mulberry is often planted in fruit-growing districts, where its fruit, not so highly prized as the raspberry and blackberry, serves as a decoy to the birds.

**Mule.** See Ass.

**Mullein,** *Mul' in,* a common weed of the roadside and rocky hills, belonging to the Figwort Family. The first year it presents only a circle of thick, woolly leaves, which lie close to the ground in a flat rosette. The leaves are light green and so closely covered with fine hairs that they present a silvery-white appearance, especially when touched with moisture. Its flatness and the bitterness of its juice prevent this plant from being trampled down or eaten by cattle; hence its commonness in fields. Its woolliness renders it hardy far north. The second year the mullein sends up a long, leafy stalk, sometimes six or eight feet in height and densely set with pale yellow, irregular flowers, which open a few at a time, those at the base blooming first. The base leaves are long and clasp the stalk; nearer the flower spike, the leaves are shorter and narrower. The flowers are followed in the fall by globular, brownish seed pods.

MULLEIN

Like most weeds the mullein was brought here from the Old World for medicinal purposes, and because of its hardiness it has become a common weed. A variety of white mullein, with an unwinged stem, is found in waste places only; and a moth mullein, with smooth stem growing only from two to three feet in height and bearing its flowers in clusters, is another roadside variety.

**Mul'let,** a large family of fish all of which are considered excellent food. The members of the family are chiefly recognized by peculiarities of their skeletons and by a gizzardlike stomach, which seems to have developed because of the mud-dwelling tendencies of this fish. All are stout, about two feet in length, with large scales and a slaty-blue coloration. Most of them are marine fish dwelling in the bays of Atlantic and Pacific coasts of both continents. They feed by filtering the vegetable matter from the rich mud and expelling the sand and other unused portions from their mouths. The smallest mullets are called the whirligig mullets from their habit of whirling rapidly near the surface of the water. The mullet which was enjoyed by the epicures of ancient Rome is a member of the Perch Family, and is still sold in London markets.

**Mu'lock, Dinah Maria.** See CRAIK, DINAH MARIA.

**Mulock, Sir William** (1843- ), a Canadian statesman, born in Ontario and educated at Toronto University and the Royal Military School. He practiced law in Toronto, examined in and lectured on equity for the Upper Canadian Law Society, and from 1882 to 1905 sat as a Liberal in the House of Commons, where he was actively interested in all legislation pertaining to agriculture, banking and commerce. Meanwhile, in 1896, he entered the Laurier cabinet as postmaster-general, in which capacity he was responsible for the establishment of a three-cent Canadian postage rate from Canada to all sections of the empire and for the adoption of the penny postage within the empire. At the same time he wiped out the deficit in his department and secured a surplus. While postmaster-general he also established the department of labor, of which he became the first minister, and in October, 1905, he became the first chief justice of the exchequer division of the Ontario High Court of Justice. To Sir William is due the establishing of direct steam communication between Canada and South Africa.

**Mum'my,** an embalmed human body, preserved after the manner of Egyptian embalming. The Egyptians exercised great care in regard to preservation of the dead. The process of embalming took 70 days, the body being soaked for that period of time in preservative solutions and then swathed in linen bandages, sometimes of 20 thicknesses. A great number of Egyptian mummies in excellent state of preservation have been found. They are of light weight and are yellowish in color.

**Mumps,** a contagious disease, common among children. It takes the form of inflammation of the salivary and parotid glands and causes swelling in the face and neck. The disorder occurs usually in cold, damp weather. It may affect only one side of the face, or both. Preliminary symptoms are soreness in the jaw and earache. No specific treatment is necessary. The system should be kept in generally good condition otherwise, and great care exercised for some time after the disappearance of the swelling to prevent the patient from taking cold, as serious brain troubles have been known to result from want of such precautionary measures at this time.

**Münchhausen,** *Munk' how" zen,* **Hieronymus Karl Friedrich,** BARON (1720-1797), a German soldier, born in Bodenwerder. He was possessed of a daring spirit of adventure and a boundless imagination, and the exaggerated accounts which he gave of his own bravado in the Turkish campaign of 1737-39 were rendered with a calm and a methodical lying, the most unique in the history of literature. Rudolph Erich Raspe gathered his marvelous tales into an Eng-

lish edition in 1785. Of Münchhausen himself, whose name has grown proverbial half the world over, it is said that his imagination outlived his memory, and that during his old age he believed more firmly than did any one else in these wonderful inventions of his own mind.

**Muncie,** *Mun' sy,* **Ind.,** a city and county seat of Delaware Co., 54 m. n.e. of Indianapolis, on the West Branch of the White River and on the Cleveland, Cincinnati, Chicago & St. Louis, the Lake Erie & Western, the Chicago, Cincinnati & Louisville, the Central Indiana, the Chicago, Indiana & Eastern and other railroads. The city has iron and steel works, machine shops, canneries, paper and pulp mills, glass factories, steam-boiler and iron-bedstead works and manufactories of silver plate, lawn mowers, agricultural implements, wagons and carriages, gas engines and gas fixtures, men's clothing, knit underwear, caskets and undertakers' supplies, fruit jars and novelty wares. There is a large trade in the various manufactured articles, coal, farm products and live stock. There are also railroad repair shops. Muncie is the seat of the Eastern Indiana Normal School. Here are a fine public library and city hospital. Population in 1910, 24,005.

**Mun'goos.** See ICHNEUMON.

**Munich,** *Mu' nik,* (Ger. München), a city of Germany, the capital of Bavaria and the third largest town of the empire. It is frequently called the most uniformly beautiful city in Europe. Two of the finest streets are the Maximilianstrasse and the Ludwigstrasse, in which are some of the most important edifices. Among the buildings are the royal palace, Hoftheater, the court church, the town hall, the new palace of justice, the old Pinakothek, or art gallery, the new Pinakothek, the Glyptothek, which is a building containing a series of valuable ancient and modern sculptures, the Schack Gallery, the Industrial Art Building, the Bavarian National Museum, the royal library and the university. The Hofgarten, the English garden and the cemeteries are imposing and beautiful. A large number of statues adorn the city, and Munich, preeminently æsthetic, is the leading school of painting. The industrial development is inferior, but the principal manufactures are musical, astronomical, mathematical and surgical instruments, leather, jewelry and glass. Beer constitutes the chief export. Glass staining, wood carving and bronze founding represent the handicrafts. King Louis I did much to further the magnificent growth of the city. Population in 1905, 538,393.

**Municipal,** *Mu nis' i pal,* **Government,** the government of a city, town, village or other minor civil division of a state. It is most often applied to the administration of the affairs of a city, and if such government is a failure the state is endangered, both because the cities have such a large proportion of the population, and because the character of the whole country is so largely influenced by city conditions. Municipal government as now organized in the United States and, in fact, throughout the world, is administered by a mayor and common council through various executive boards. The mayor is elected usually by the people but often by the council. He is the head of the executive department and has the appointment of a large number of officials. In the hands of the council are most of the legislative functions, though the mayor usually has veto power over its measures. The judicial officers of the municipality are merely agents of the state, although there are local justices for the purpose of trying petty offenders without delay. Other duties of city governments are to be seen in the laying out of new streets and in enforcing building regulations. Usually the expense is assessed upon the property benefited and the city is reimbursed in part. The care of bridges and streets is everywhere a municipal function, and lighting and transportation, as well as waterworks, are among the principal objects of the care of municipalities.

There is, however, what is known as a "municipal problem," involving the

question of maintaining honesty and efficiency in municipal affairs. Numerous policies have been suggested as a means of reform, among them being proportional representation, direct legislation, ballot reform, nominations by the people, the organization of local political parties and restriction of suffrage to taxpayers. Municipal ownership and operation of such public utilities as waterworks, street-car lines and lighting are common in Europe, and gaining ground in the United States. See COMMISSION FORM OF GOVERNMENT; MUNICIPAL OWNERSHIP.

**Municipal Ownership,** a general term for the ownership of anything by a municipality. The name is specifically applied to the ownership, by a city, of such public utilities as waterworks, street railways and lighting plants, and usually implies municipal operation as well as ownership. The necessity of providing adequately for the ever-increasing needs of cities in water, light and transportation has led to the belief on the part of many that all public utilities should be controlled by the people and not by private corporations. To insure the required grade of supply and operation, and to guard against excessive charges, it is necessary that the municipality shall either own the public enterprises or regulate them in the hands of private operators. The proper scope of municipal ownership is still a subject of debate. The nearest approach, however, to a general agreement is that it may embrace all those services which are largely of a sanitary character, like water supply and sewerage, and that it should be restricted to quasi-public industries in which private competition is uncertain. Another point agreed upon is that municipal ownership should not be carried so far as to increase municipal debts beyond reasonable limits.

The present status of municipal ownership in the United States is that a large percentage of the waterworks, including nearly all of the larger ones, are owned by the cities which they supply; while next in order come electric-lighting plants. Few gas works and practically no street railways are owned by American cities, though such ownership is common in Great Britain. With the exception of sewerage systems, which rarely yield a revenue, waterworks are the most common form of ownership, but the control of telephones, docks and wharves and public markets is now being generally considered as rightfully belonging to the scope of municipal enterprises.

**Munkácsy,** *Moon' ka che,* **Mihály** (1844-1900), a Hungarian painter, whose real name was Michael Leo Lieb. His treatment of dramatic themes was broad and powerful, and he had a great vogue in his day. His most representative canvases are *Milton Dictating "Paradise Lost" to His Daughters, Christ before Pilate* and *Golgotha.*

**Munroe,** *Mun ro',* **Kirk,** (1850- ), an American writer, born near Prairie du Chien, Wis. He studied civil engineering at Harvard, and while on the road, employed by the Northern and Southern Pacific railways, he accumulated varied material, which he later used in his stories for boys. After being the first editor of *Harper's Round Table,* from 1879 to 1882, he removed to Florida, upon his marriage with a daughter of Amelia Barr. He has written *The Flamingo Feather, The Fur Seal's Tooth, At War with Pontiac, With Crockett and Bowie, Under the Great Bear, For the Mikado* and *The Belt of Seven Totems.*

**Mu'ral Circle,** a graduated circle mounted for meridian measurements. The circle is usually made of brass, having an axis exactly at right angles to its plane, pointing due east and west, and connected with a telescope. The circle and telescope are firmly mounted on stone piers for observing and measuring objects in the celestial meridian alone. The graduation of the circle is as nearly perfect as it can possibly be made, and is carried to so fine a fraction that a microscope is often used to read it. It is also called meridian circle. See ALTITUDE; AZIMUTH.

**Murchison,** *Mur' chi sun,* **Sir Roderick Impey** (1792-1871), a British geologist, born in Tarradale, Scotland, and educated at a military school. He entered the army but became interested in scientific studies through the influence of Sir Humphry Davy, and soon gained a reputation as a geologist. He made a thorough survey of England and Wales and reclassified the geological systems, being the first to give the Silurian system distinct recognition. He then made a survey of Russia under the patronage of Nicholas. Murchison was the author of numerous works on geology, among them being *The Silurian System* and *The Geological Structure of the Northern and Central Regions of Russia in Europe.*

**Mur'der,** "the offense of unlawfully killing a human being with malice aforethought, expressed or implied." In the United States murder committed intentionally is called murder in the first degree, and in most states it is a capital offense. The time elapsing between the decision to commit the act and its execution is not considered as a factor in determining the degree of the murder. The act may follow the decision instantly or at the end of an extended period. If another than the person intended becomes a victim of the murderer, the degree of the crime is the same; that is, if A intends to shoot B but shoots C instead, he is adjudged to have committed murder in the first degree. An idiot, an insane person, and a child too young to possess discretion cannot in the eye of the law commit murder. Manslaughter differs from murder in the first degree in that the act was not intentional but due to gross carelessness or neglect, or to an accident which in the opinion of the court might have been prevented. It is usually punished by imprisonment.

**Mur'free, Mary Noailles** (1850- ), an American writer, whose novels appear under her pen name, Charles Egbert Craddock. She was born in Murfreesboro, Tenn. Deprived of the customary activity of childhood by lameness, from an early age she devoted herself to the study of the people of the Tennessee mountains, where she passed her summers. Her novels, the first of which appeared in 1884, portray with fidelity and charm the life and scenery of the mountains. Her writings include *In the Tennessee Mountains, The Prophet of the Great Smoky Mountain, In the "Stranger-People's" Country, The Young Mountaineers, A Spectre of Power* and *The Fair Mississippian.*

**Murfreesboro,** *Mur' freez bur o,* or **Stone River, Battle of,** a severe engagement of the Civil War, fought Dec. 31, 1862, and Jan. 2, 1863, near Murfreesboro, on the Stone River, Tenn. Forty-one thousand Federals of Rosecrans's army moved from Nashville against Murfreesboro, where Bragg and 38,000 men had taken up winter quarters, and on Dec. 30 the two armies were within cannon shot of each other. Rosecrans's plans for the following day were prevented by Bragg, who took the initiative and made such a vigorous assault upon the Union right wing that it would have been annihilated save for the work of Thomas. By nightfall, however, honors were evenly divided, and the next day the armies rested. On Jan. 2 the Federal batteries opened so murderous a fire that 2000 Confederates fell in 20 minutes; the Union troops gained a slight advantage, and before the morning of Jan. 4 Bragg and his men had stolen away. The Federals lost about 13,000 men; the Confederates, nearly 12,000.

**Mu"riat'ic Acid,** or **Hy"drochlo'ric Acid,** a colorless gas having a sharp, penetrating odor capable of producing extreme irritation of the membranes of the nose and throat. It is a compound of hydrogen and chlorine and may be prepared by burning a hydrogen flame in an atmosphere of chlorine gas. Hydrochloric acid is easily dissolved in water, and in that condition is commonly known. It has been liquefied under the pressure of 40 atmospheres at a temperature of 10°C., but the liquid is less active than the solution of the gas in water.

Commercial hydrochloric acid is prepared on a large scale by the action of

sulphuric acid upon salt. The salt and acid are heated in large iron vats, and the gas produced is passed into towers filled with coke, through which water is constantly oozing. The gas is entirely dissolved by the time it reaches the base of the tower. Commercial hydrochloric acid is generally slightly yellow in color, owing to the presence of iron as an impurity. It is used in the arts and in the manufacture of glue and some medicines.

**Muril'lo, Bartolomé Esteban** (1618-1682), a famous Spanish painter, born at Seville. In 1642 he visited Madrid and sought the aid of Velásquez, then at the height of his power, through whose influence Murillo was permitted to copy the masterpieces in the Royal Gallery. He returned to Seville in 1645 and executed a series of sacred pictures for the Franciscan convent, which brought him fame. In 1648 he married a wealthy lady of noble rank, and their house became a meeting place for artists and connoisseurs. Murillo founded the Academy of Arts at Seville in 1660, and was its first president.

Murillo's right to fame rests upon his ability to give depth and atmosphere to groups of figures and to put into them warm and transparent color. His subjects were of a religious nature, and in these pictures he sometimes gave oversentimental expression, and was more truthful in representing the ordinary and natural than in introducing a lofty type of intellectual or ideal beauty. There are many specimens of his work in Spain and in other parts of Europe. His most splendid works were executed for the Hospital de la Caridad, and they include *Moses Striking the Rock, Return of the Prodigal, Abraham receiving the Three Angels* and the *Miracle of the Loaves and Fishes.*

**Mur'ray, Sir John** (1841-1914), a distinguished scientist, born in Ontario, Canada, and educated in Victoria and Edinburgh universities. In 1868 he visited Spitzbergen and the Arctic on board a whaler, from 1872 to 1876 he explored on the *Challenger* the physical and biological conditions of the great ocean basins, and he subsequently took part in the explorations of the *Triton* and the *Knight Errant* and visited the oceanic islands of the tropics. Later Sir John was engaged in a bathymetrical physical and biological survey of the fresh-water lakes of the United Kingdom. Besides editing the report of the expedition of the *Challenger* in 50 volumes, he had written extensively on scientific subjects. He was associated with a great number of British and foreign scientific bodies and also received honors from many others.

**Murray, John Clark** (1836- ), a writer on philosophy and ethics, born at Paisley, Scotland, and educated at the universities of Glasgow, Edinburgh, Heidelberg and Göttingen. In 1862 he removed to Canada to accept the position of professor of mental and moral philosophy in Queen's University, Kingston. In 1892 he took the same chair in McGill University, becoming professor emeritus in 1903. Besides numerous contributions to periodicals, he has written, among other books, *A Hand-book of Psychology, An Introduction to Ethics, An Introduction to Psychology* and *Memoir of David Murray.*

**Murray River,** the chief river of Australia, formed by many streams flowing down the western slopes of the Australian Alps and uniting in a large stream that winds its tortuous way to the sea by means of Lake Alexandrina not far from the city of Adelaide in South Australia. The Murray is important for its fisheries and for its navigation, because, though it is too shallow to receive large vessels, the smaller ones form a means of transportation between the many cities along its course. The Darling River, a northern stream, is the chief tributary.

**Muscatine,** *Mus" ka teen',* **Iowa,** a city and the county seat of Muscatine Co., 25 m. s.w. of Davenport and 14 m. e. of Des Moines, on the Mississippi River and on the Chicago, Milwaukee & St. Paul, the Chicago, Rock Island & Pacific, the Iowa Central and other railroads. Muscatine is the center of the vast pearl-button industry of this part of

the Mississippi Valley, the buttons being made from river mussel shells. In the vicinity are deposits of coal, and on Muscatine Island, a short distance below the city, large quantities of watermelons are grown. Dairying and truck farming are among the chief industries of the surrounding agricultural district, one of the principal crops being potatoes. A large trade is carried on in lumber, fruit and hogs. There is considerable forested land in the neighborhood. The manufactures include buttons, boxes, tile, brick, wagons, carriages, packing cases, pottery, flour, oatmeal and pickles. Important industrial establishments are foundries and machine shops, rolling mills, canning factories, lead works and lumber mills. Situated upon high rocky bluffs, the city offers a fine view of the river. Its chief features are Musser Library, a public park, a soldiers' monument and a highway bridge across the river. On the site of an old trading post the place was settled in 1833, and in 1839 incorporated as Bloomington; in 1851 it was chartered and renamed. Population in 1910, 16,178.

**Muscles,** *Mus' 'lz,* the masses of tissue of the animal body which form the organs of motion. They are the fleshy or meaty portion of the body covering its framework and giving to it its shape and about one-half of its weight. They may be classified according to their structure as striped, or striated, and unstriated. All are composed of small cells, or fibers, arranged in bundles and held together by an adhesive substance and interspersed with blood and lymph vessels, which convey nourishment and carry off waste material; and by nerves which stimulate their activity. The peculiar properties of muscles are contractility, or power to contract, when stimulated to action by nerves, by heat or electricity, or when acted upon by mechanical agents; elasticity, or power to expand and stretch after contraction; tonicity, or the slight tension which is their normal condition in repose.

The striped muscles are voluntary; that is, under the control of the will.

MUSCLES

They are composed of slender, muscular fibers, each about an inch in length and $\frac{1}{500}$ of an inch across. Each fiber is enclosed in a very delicate, but tough and elastic, sheath called the sarcolemma, and shows alternate light and dark transverse bands or stripes. The whole muscle is enclosed in a sheath called the perimysium, and is penetrated by nerves from the cerebrospinal column. The voluntary muscles are such as are found in the biceps of the arm; the great pectoral muscle, which draws the arm in front of the chest; the sartorius muscle, which assists in the bending of the knee; the extensor muscles, which extend or straighten the leg; the masseter muscles, the chief muscles of mastication, elevating the lower jaw by their contraction; and those occurring in other parts of the body.

The typical form of voluntary muscle is a rounded body, tapering at both ends and terminating in tendons, by means of which they are attached to the skeletal bones (See TENDONS). A beautiful example of the peculiar value of the terminations of muscles in tendons is seen on the back of the hand, across which the tendons pass like wires from the end joints of the fingers to the muscles above the wrist, which control those extremities. The tendons are inelastic and communicate muscular movement direct. At the wrist they are held in place by a band of ligament. This arrangement gives grace and beauty, as well as dexterity, where a continuation of muscle would make the hand bulky and clumsy and render it unfit for the work it now performs. The muscle may be attached to two or more points. The point remaining stationary during muscular activity is called the origin, and the point yielding to muscular contraction is known as the point of insertion. The origin of the biceps muscle of the arm is at the shoulder; its point of insertion is in the forearm just below the elbow.

In unstriated, or involuntary, muscle the fibers appears as long, slender, flat cells, tapering at both ends. They are shorter than the fibers of the voluntary

muscles and are slower in their movements. These muscles constitute a large part of the walls of the alimentary canal, blood vessels and intestinal tract. They are not controlled by the will, but carry on their functions automatically under the stimulation of the nerves from the sympathetic, or ganglionic, nervous system. These muscles are usually attached to the softer parts of the body and are without extended tendons.

Intermediate between the striated, voluntary muscles and those of the unstriated, involuntary variety is the cardiac muscle of the heart, which is both striped and involuntary. It is composed of short, cylindrical cells arranged like beads on a string, lying also in bundles. It is remarkable for its rhythmic contractions, which pump the blood from the heart to all parts of the body at regular intervals. See HEART.

Nearly all muscles are arranged in pairs, the contraction of one causing a certain movement, the contraction of the other restoring the part moved to its original position; one set of muscles opens the eye, those in opposition close it. The extent or limit of the action of a muscle depends upon the length of its fibers; the degree of force which it is capable of exerting is determined by the number of its fibers. The voluntary muscles are capable of a high degree of education. See NERVOUS SYSTEM.

**Muses,** *Mu' zez,* in Greek myths, nine daughters of Jupiter and Mnemosyne (Memory). Each presided over some special branch of literature, music or the liberal arts and sciences. Clio was Muse of history; Calliope, of epic poetry; Euterpe, of lyric poetry; Melpomene, of tragedy; Terpsichore, of the dance; Erato, of love poetry; Polyhymnia, of sacred poetry; Urania, of astronomy; and Thalia, of comedy.

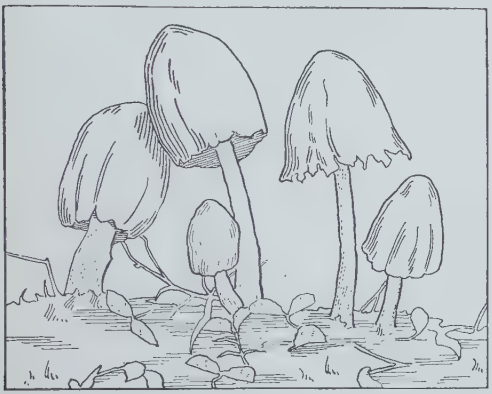
**Museum,** *Mu ze' um,* an institution for the collection, exhibition and study of works of art, historic relics and objects of nature. The word comes from the Temple of the Muses, which was a place of study. Public museums are the outgrowth of private collections usually made by sovereigns, who in time threw them open to the people. Museums of art are often known as art galleries; others are classified according to the nature of their collections, as museums of natural history, museums of anthropology and geological museums. With the exception of Turkey all European countries have museums, and they are found in nearly all cities. The British Museum is the greatest in the world; next in importance is the Louvre in Paris. Others of note in Europe are the Luxembourg, chiefly devoted to paintings; the royal museums of Berlin, Dresden and Munich; and the museum in the Vatican in Rome. See BRITISH MUSEUM; LOUVRE, PALACE OF THE; VATICAN.

The leading museums in the United States are the National Museum at Washington; the Peabody Museum at Cambridge, Mass.; the Museum of Natural History, Boston; the Boston Art Museum; the American Museum, New York; the Field Columbian Museum, Chicago; the Free Museum, Philadelphia; the Carnegie Museum, Pittsburgh; the Golden Gate Museum, San Francisco; and the City Museum, Milwaukee. The leading museums of Canada are that of Laval University, Quebec; the Château Ramesey, Montreal; and the museum of the University of Toronto. See NATIONAL MUSEUM OF THE UNITED STATES; SMITHSONIAN INSTITUTION.

**Mush'rooms,** a group of widely-known fungi, growing on decaying animal or vegetable matter or in the rich mold of dark, moist forests. They are flowerless plants and reproduce by tiny spores which take the place of seeds. These spores falling upon the ground in warm, moist situations, where there is plenty of nourishment, absorb food, become swollen and divide. The divisions swell and they in turn divide until there are long chains of white or grayish threadlike tissues known collectively as mycelium. These become matted at some points and send up little spherical heads, called buttons, which are usually white. As the button expands, the veil, which covers it, breaks and discloses an

umbrellalike growth, divided into cap and stem; the remains of the ruptured veil upon the stem is called the annulus.

Other mushrooms are wholly surrounded by an enveloping membrane, called the volva, which, though it becomes broken as the plant expands, may be seen in little fragments upon the cap or in a cup at the base of the stem. Such a cup is called the "death cup," not



MUSHROOMS

because all mushrooms which have it are poisonous, but because all poisonous mushrooms do have it. The caps of different mushrooms differ in their manner of bearing spores. Some produce them upon gills, thin, platelike strips which radiate from the stem to the edge of the cap on the underside; some in pores, and others upon spines. If the cap of the mushroom is carefully removed and placed upon white or colored paper, a spore print, or circle of the fallen spores, lying just as they drop from the cap, may be secured. Mushrooms are classified according to the color of these spores, and according to their consistency, some being waxy and others dry and dustlike.

There is a common custom of speaking of this fungus as if there were two classes, toadstools and mushrooms, the former being poisonous and the latter not. This is only custom, however, for technically all are mushrooms and are poisonous mushrooms or edible mushrooms. Probably the name toadstools arose from their habitual growth in damp and darksome situations, also the rendezvous of toads. No hard and fast rule can be given for distinguishing edible from poisonous mushrooms. Those that are at all old, those that have the death cup, and buttons too young to be classified should be avoided, and probably none should be eaten unless passed upon by an expert. The most common edible varieties are the meadow mushrooms, coral mushrooms, morels and the honey mushrooms. The most frequently occurring poisonous species are those of the amanita group, having sticky red or yellow caps.

Mushrooms may be parasites, growing on living plants, or saprophytes, growing upon dead ones. When growing upon a tree they frequently cause its death by producing a white rot of the tissues. Since the spores generally gain entrance through wounds, their growth can be hindered by painting all bruises with tar. The fairy-ring mushrooms are saprophytes and grow in yearly widening circles in yards or meadows. It was once believed that these circles of mushrooms enclosed the space in which fairies held their nightly revels, and the sudden disappearance of the plants meant that the fairies had been in some manner displeased and so left that spot in anger. Scientists, less poetical, claim that the mycelium exhausts the food in the soil within the circle so that only those spores which fall outside develop; thus the circle widens. At last when the mycelium has spread thickly without as well as within, none of the spores develops and in a single night the fairy ring vanishes.

**Music,** the art of uniting sounds so that they arouse the emotions and make appeal to the intellect. For a discussion of the natural laws governing musical sound, see SOUND. Music more than the other fine arts owes its value to its variance from nature, since in its present form it is far removed from the musical sounds of bird songs or wind; thus, though a statue must bear close resemblance to the thing which it copies, a mu-

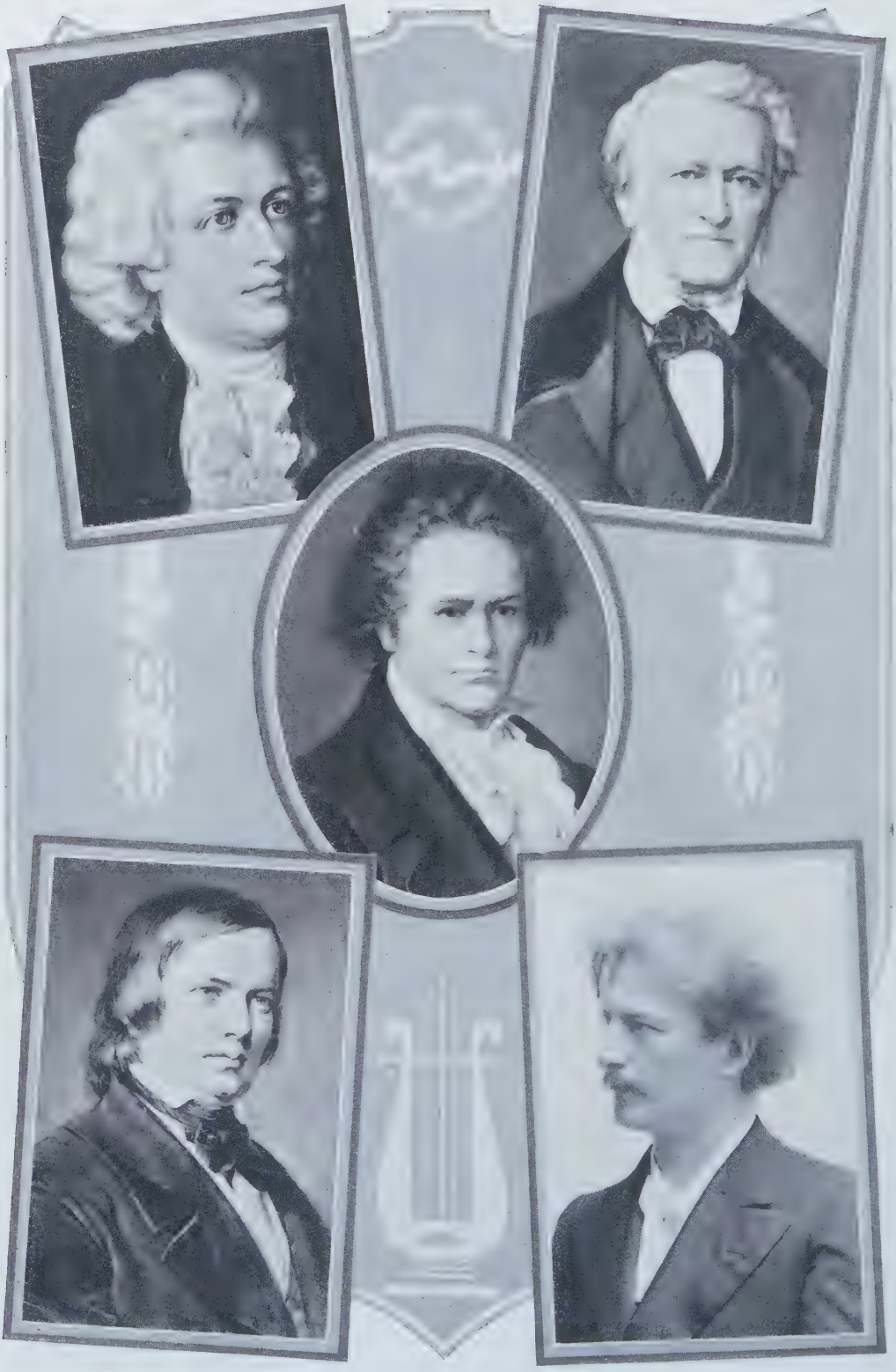
sical selection is wholly a mental product, artificial in that it has no model in nature. Because music was long unwritten, its early forms cannot be studied as those of painting, sculpture and architecture can be; hence in a double sense it is an elusive art existing wholly in the musician and dying with him unless a capable interpreter is found. Music has undergone many changes in the course of its development, and the music of one age or one people is usually unintelligible and inharmonious to another age or people. Familiarity with music, however, breeds respect, and music whose intervals are unusual and seemingly harsh at first hearing, upon acquaintance may become pleasing to the ear.

In the earliest music the emotional element was dominant; later, a reaction made music a mathematical science, almost wholly intellectual in tendency. Now, music which is both emotional and intellectual is considered representative of the modern trend.

HISTORY. *Early Period.* As has been said, music was at first wholly oral and may have had its origin in imitation of sounds of nature. The first musical instruments were probably the rude horns found in caves occupied during the Stone Age. Such instruments could produce but few notes, and thus the scale contained at first only two or three tones. This was gradually extended until the pentatonic, or five-toned, scale, which continued in use for many centuries, was formed; it is still employed among primitive people and remains in modern music in some of our simplest hymns, as *There is a Happy Land* and *Auld Lang Syne.* The songs used by the Jews in their Temple of worship and in festivals are not preserved, or, if preserved, are so altered as to be of little historical value. Musical instruments, such as the drum, cymbals, horn and harp became common and were used alone or as accompaniment to the human voice.

*Greece.* It is to Greece that we owe the formal advance of music as of the other arts; here the tetrachord, a scale of four tones, having one interval a half tone and the others whole tones, was most commonly used. Up to the time of Terpander (about 650 B. C.) this existed in many forms, called modes and further designated by the names of their originators. The lyre, the chief musical instrument, had only four strings, but could be tuned to any of the modes to adapt it to the voice of the singer; it was used chiefly to give the pitch. Terpander added a second tetrachord to the scale, making the first note of the second the same as the last note of the first; thus a seven-note scale was formed. A century later Pythagoras introduced the octave system, which is the foundation of modern music. Not long after, Athens was stirred with emotion over the music of Sophocles' *Antigone* and other dramas, the forerunner of the opera, but though the words of these are yet read with pleasure, the music has entirely disappeared. Were it in existence its chief value would probably be historical, since it would be heard by ears accustomed to modern harmony. It was sung unaccompanied except for a monotonous bass.

*Rome.* Roman music copied that of Greece but made no improvement upon it, and the art languished until it came under the influence of the Church. St. Ambrose made a collection of Hebrew melodies that had lived only in memories of exiles from Palestine, and these were from them transmitted to the Christians at Rome. With his book of songs St. Ambrose wrote also a set of laws for composition. St. Gregory, about 200 years later, made a second collection and increased the number of modes from four to nine. These two collections of songs were known respectively as the Ambrosian and the Gregorian chants, and are both in use, though the latter is the more common. Wherever the missionaries of the Church went, these chants were sung, but the melodies were transmitted from memory, aided only by a notation of dots, curves and lines, called *neumes* and intelligible only

# MASTERS IN THE WORLD OF MUSIC

LUDWIG VAN BEETHOVEN

WOLFGANG A. MOZART

ROBERT A. SCHUMANN

RICHARD WAGNER

IGNACE JAN PADEREWSKI

to one who had previously learned the tune.

Music, lacking concrete materials, lagged behind other fine arts up to the year 1100, but at that time the same spirit which was stimulating architecture began pervading music, and the construction of definite musical art forms resulted. Music became measured, and the multiplicity of details which grew up show definite proportions and relations each to each.

*Middle Period.* Hucbald, a monk of St. Amands, is responsible for the staff in musical notation, and this invention brought about a remarkable change, since it paved the way for part-music not heretofore used. This system of harmonies Hucbald called *organum* because they were played upon a great instrument of that name, unknown since the fall of Rome. The song consisted of a melody supported by a second voice singing the same a third above or a fifth below the original. Guido of Arezzo is the next great name in the history of music. He, with his pupils, copied all previously-learned melodies upon a four-line staff, an enormous work of incalculable value. He also founded the system of sight-reading by teaching his choir boys to remember their notes from the syllables beginning the lines in the hymn to St. John, which syllables, he noticed, were sung upon the successive notes of the scale. These syllables, *ut, re, mi, fa, sol, la,* with one addition and one alteration, are still in use. By means of these Guido taught the reading of an "unknown song."

Music from that time advanced rapidly, especially on the mechanical side, up to the 14th century. New musical instruments were invented, the length of notes was arbitrarily fixed and part-music became more varied. The troubadours of France and the minnesingers and mastersingers of Germany were the strongest force in secularizing music. See TROUBADOUR; MINNESINGER; MASTERSINGER; TROUVÈRE.

*Modern Music.* The beginning of musical composition in its present form was in Flanders, where a school of composers led by Dufay originated early in the 15th century. Little of Dufay's music is known, but its influence is remarked in the work of John Okeghem, one of the first teachers of the new music, and in that of Okeghem's famous pupil, Josquin Des Près, the first really great composer of the school. Though much of the music of Des Près and of his contemporaries was chiefly intellectual, there are many compositions that show a deeply emotional tendency and a passionate feeling unknown in the compositions of their forerunners. Orlando di Lasso was the last member of the Flemish group, and his compositions have delighted the world throughout the four centuries since he wrote.

During the same year England was evidently producing musicians of ability. A charming six-part song, *Sumer is icumen in,* shows great advance over other music of the times; its authorship is unknown, but the old manuscript still may be seen in the British Museum. John Dunstable was the only prolific English composer, and he is little known save through contemporaneous writers.

The Italian temperament seemed especially attracted to the new emotional music. Palestrina, though he composed music of the intellectual type, gave to his country the incentive to study the new music and to appreciate it. Palestrina's death occurred in 1594, the same year as Di Lasso's and the same year as the production of the first dramatic musical play by the Venetian musicians; thus that year may be said to mark the real beginning of the new era. Gradually but surely the emotional element pervaded the musical compositions until it had equal place with the artificial rules of time and arrangement. It was natural that in some places the pendulum would swing too far; thus musical plays that were light and graceful but that generally failed to conform to the rules of composition were written and rendered by the trouvères. The Venetian School, mentioned before, attempted a revival of classic Greek music. This re-

sulted in the production of several operas, introducing monody and the recitative form of dramatic music. The immediate appreciation of these productions carried with it such enthusiasm that the composers of the new school brought out many excellent works, the music and librettos of which were both of exceptional quality. The organ and other instruments seemed suddenly to become popular, and music-printing came to the aid of this art as printing already had to literature.

The oratorio, whose development was due to Filippo Neri, was born of this era. It was a musical play designed to teach religious subjects and was performed in the oratory of the church. The cantata (the *singing* piece), the sonata (the sounding piece), the tocatta, the sonata-allegro, and other forms of musical composition appeared and are comparable to the verse forms of literature. In Italy, Scarlatti, Stradella and Lotti; in England, Purcell; in France, Lulli; and in Germany, Keiser, Schutz, Scheidt and Schein were bringing music up to the glorious period of its history. The mechanical changes they introduced were the use of measures and of marks of expression.

The 18th century was introduced by the two great names, Bach and Handel. These men were both born in 1685 and lived to practically the same time, but exerted a widely differing influence upon the musical world. Handel gave his attention to the development of the orchestra and to experiment in orchestral compositions. Bach was the founder of modern technique and perfected the fugue, which up to his time had been a lifeless musical form. He gave new meaning to the organ and produced besides much excellent voice music. See HANDEL, GEORGE FREDERICK; BACH, JOHANN SEBASTIAN.

The names of this age are household words today and the compositions produced are still the standard of the musical world. The invention of the pianoforte, though at first not greeted with acclaim and thought only fitted for light music, became, under skilled fingers, a new means of expression, and the lyric poets of the period made necessary the invention of the *Lied.* Thus through Haydn, the master of symphonies; Mozart, who gave new life to the declining Italian operas; Beethoven, who added his emotional genius to all lines of musical advance; Rossini, whose melodies are best appreciated when unaccompanied by the text; Schubert, the inventor of the minuet; Mendelssohn, with his finished melodious productions; and Franz and Schumann, who best expressed themselves in song, music advanced to its present place among the fine arts. The revival of the opera adds the names of Bellini, Donizetti, Gounod and Thomas, whose chief faults lie in the lack of harmony between their music and the text. This fault was discerned by Wagner, the great prophet of the opera who through difficulties, disappointments and misunderstandings, achieved a final and lasting triumph. Among his fundamental rules he insisted that the music be an interpretation of the text, that the opera have an unassailable unity and that the libretto be of such excellence that it alone would serve as a dramatic production. The music of operas had no set form but followed the mood of the text. His work in the realm of opera was to lead composers to loftier ideals to make, not merely melody, but a powerful drama expressed through music as well as through words. Following Wagner came Verdi, the composer of *Aïda,* and Bizet, who produced *Carmen.*

Some races are especially well endowed with musical taste. Those which have traditional and inherited folk songs, the music nearest their lives and hearts, with gifted composers to handle them, show signs of creating national schools. Bohemia and the northern countries of Europe have produced much worthy folk music and many talented musicians.

Music, unlike painting and sculpturing, can scarcely be said to be national in its schools. The great musicians belong to the world, and their compositions, unlike great paintings, may be familiar

in every part of the world through great popular demand for the best. Thus the works of the great pianists, Liszt, Rubenstein, Strauss, Czerny, Cramer and Chopin; of the violinists, Ysaye and Kubelik; of the orchestra composers, Berlioz, Tschaikowsky, Saint-Säens, Massenet, Mendelssohn and Chaminade, no less than the works of the American composers, Paine, Chadwick, MacDowell and Parker, are enjoyed and understood everywhere regardless of the nationality which they represent.

The present tendency in music may be compared to the post-impressionistic and futurist tendency in painting and is manifest in a growing revolt against melody and definite themes; thus, the symphonic poems of Strauss and Mahler aim to express a mood and are unclear and restless. This musical impressionism is resulting in a style in which tone-picturing is followed by free modulation and full rich harmonies. Its leading spirits are Mahler, Debussy, Franck, Weingartner, Strauss and Reger.

**Musk,** a substance obtained from the musk deer and used in fixing the scent of expensive perfumes. The best is imported from Tonkin, China, while cheaper grades are obtained from India and Siberia. Musk is used to a limited extent in medicine. See MUSK DEER; PERFUMES.

**Musk Deer,** a small, deerlike animal, by some scientists classed in the Deer Family and by others placed as the single genus of the Musk Deer Family. It differs from deer in three particulars: both sexes are without horns; the upper canine teeth extend in long, curving tusks, that are sharp and strong; and the four toes are of nearly equal length, so that the animal can fairly grasp the precipitous rocks upon which it climbs. The musk deer is a solitary, timid creature, fleeing with remarkable speed at the approach of man. Its name refers to the musk gland of the male, situated below the abdomen and secreting a sirupy liquid, which, when secured by hunters and dried, forms the powdered musk which is a basis of many perfumes. The musk deer inhabits Siberia and Tibet, generally making its home in the highest regions. See PERFUMES.

**Muske'gon, Mich.,** a city and the county seat of Muskegon Co., 38 m. n.w. of Grand Rapids, on Muskegon Lake, an enlargement of Muskegon River, about 4 m. from Lake Michigan. Entering the city are the Pere Marquette, the Grand Rapids & Indiana, the Grand Trunk and other railroads. Electric railways connect the city with adjacent towns, and steamboat lines with Chicago, Milwaukee and other lake ports. Muskegon has one of the finest harbors on Lake Michigan, ice-free throughout the year. The trade is chiefly in lumber, fruit, celery and other vegetables and in the local manufactures, which include motors, boats, electric cranes, furniture, billiard tables, refrigerators, curtain rollers, pianos, paper, knit goods, flour and beer.

Through the munificence of Charles H. Hackley, a local lumberman, the city has a public school endowment fund of $2,000,000, and a manual-training school, which has an endowment of $600,000. Other gifts from the same donor are a public library, a hospital, a gymnasium, a public square, upon which have been erected a soldiers' monument and several bronze statues, and a poor fund endowment. In Hackley Park are statues of Lincoln and Farragut, and at the Hackley School, a statue of McKinley, all three the work of C. H. Niehaus. Muskegon was settled in 1834 on the site of a trading post established here in 1812. The town was laid out in 1849 and incorporated as a village in 1861; it received its charter as a city in 1869. Population in 1910, 24,062.

**Mus'ket,** an army gun that has been quite generally replaced by the army rifle. The musket was a heavy, clumsy gun, loaded from the muzzle. The barrel was large and smooth-bore, and the gun was not very reliable. The older guns of this order were fired by means of the flintlock, wheel lock and, finally, by percussion caps. Later the musket was greatly improved, being made lighter and more accurate. In the early part of the

19th century the bore was rifled, giving to the bullet much greater penetration. See RIFLE; FLINTLOCK.

**Musk'mel"on,** a creeping vine of the Gourd Family, prized for its sweet, luscious fruit. The stem lies prostrate upon the ground and bears rough tendrils and coarse, five-angled, roundish leaves; the flowers are large, short-stemmed and of orange-yellow color. The fruit has a soft, gray-green rind, which surrounds a sweet, yellow pulp, on the inner surface of which the seeds are borne. The fruit is generally globular in form and from six to eight inches in diameter. The melons ripen in the summer and are a pleasing dessert. The favorite varieties are the cantaloupe and nutmeg melon. They are grown throughout temperate and subtropical climates, wherever there is a rich, warm soil. They should be planted in hills four to six feet apart and with six to ten seeds in a hill. To insure ready growth the hills should be well fertilized.

Melons are attacked by various insects which may be kept down by spraying the growing vines with Paris green or tobacco washes. Fungus diseases are checked by spraying with Bordeaux mixture. See INSECTICIDE.

**Muskogee,** *Mus ko' je,* **Okla.,** the county seat of Muskogee Co., situated 130 m. n.e. of Oklahoma City on the St. Louis & San Francisco, the Midland Valley, the Missouri, Kansas & Texas and other railroads. It is the commercial center of a large agricultural region and has an extensive trade in farm produce and live stock. There is an important oil field in the vicinity which furnishes an excellent grade of petroleum. The manufactories include cotton gins, cotton compresses, cottonseed-oil mills and flour mills. The city is the seat of several educational institutions in charge of religious denominations. Among these are Spaulding Institute (Methodist Episcopal Church, South), Nazareth Institute (Catholic) and Indian University (Baptist). Muskogee was founded in 1870. It was the chief town of former Indian Territory and the center of activities for the Five Civilized Tribes. It was chartered as a city in 1898. Population in 1910, 25,278.

**Musk Ox,** a heavy Arctic animal belonging to the Bovine Family and found only in eastern Greenland. It has a low, heavy head with long, curving horns. The fur is dark and long, half concealing the slender legs and growing so thickly upon the shoulders as to give the musk ox a humped appearance. The tail is short and almost concealed beneath the long fur. The name musk ox refers to its musklike odor, which does not, however, render the flesh unpalatable. Like buffaloes, the musk oxen travel in herds and when attacked form a close circle with the calves in the center, thus presenting to the foe an unbroken barrier of pawing hoofs, waving horns and blazing eyes.

**Musk'rat",** an American member of the Rat Family, living in woodlands and in water. It has a plump, fur-covered body, small head and long, hairless tail. Its thatched burrow is built near the bank of a stream and has an opening underneath the water as well as one above. The hind feet are webbed, as are those of all semiaquatic animals. The fur is soft and highly prized. The name muskrat refers to the musky secretion produced by both sexes. An Asiatic shrew, which secretes a like substance, is often wrongly called the muskrat.

**Mus'sel,** a group of chiefly salt-water Mollusks. The name is applied indefinitely to a number of genera, all of which have long, two-valved shells. They fasten themselves to rocks by means of a stringy secretion known as a byssus, which they can produce at will. Some are able to burrow into rock ledges or coral reefs for purpose of concealment. Mussels are eaten in great quantities in European countries but are not so highly prized as the oyster. River mussels, or fresh-water clams, are found in lakes and streams throughout the United States. See CLAM.

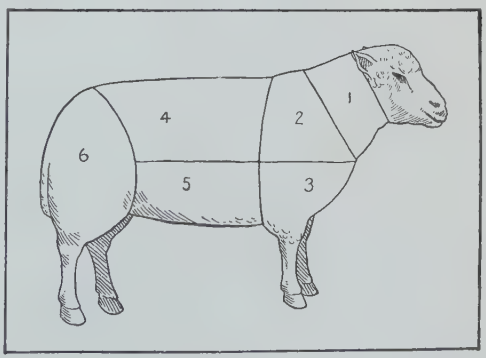
**Musset,** *Mu" seh',* **(Louis Charles) Alfred de** (1810-1857), a French poet, novelist and play writer. From law and medicine he turned to literature and was

recognized as a poet of distinction at the age of 20, but his early dramatic failures were sufficiently discouraging to cause him to give up publishing for some time. When his works finally appeared they were marked by extraordinary brilliance, passion and fancy, and he was accorded the rank of one of the greatest poets of his age. He saw the shortcomings of the Romanticists and Classicists, and, taking a middle ground, wrote in a style distinguished for its marked originality. His works include *Namouna, André del Sarto, The Caprices of Marianne, Night of May, The Confession of a Child of the Age, Bettine, Carmosine* and *No Trifling with Love.*

**Mus'tard,** a family of rank herbs which have escaped from gardens and are now found wild all over the United States. All members of the family are distinguished by their sharp, biting, watery juice. The stems are branching and tough, being so fibrous as to be almost woody; the leaves are coarse, deeply-cut and covered with stiff hairs. The bright or pale yellow flowers grow in slowly-opening clusters, those nearer the base of the stem blooming first and producing fruit before the upper ones open. The individual flowers are easily recognized by their four petals and four sepals, which are borne in the form of a cross. There are also four stamens, two of which are shorter than the other two. The fruit is an oblong pod having large, brown seeds; as these pods mature, the flower stems lengthen and hold the fruit out from the stem. Mustard seed is used as a condiment.

**Mu'tiny,** an uprising against constituted authority. The term is used specifically of sailors and soldiers in rebellion against their officers. Mutiny includes not personal rebellion alone, but an attempt to incite mutiny, refusal to expose a mutinous plot or those connected with it, or failure actively to oppose and seek to thwart any such plot. According to the *Articles of War,* in the United States and Great Britain it is a crime punishable by death for an officer or a private soldier who is present at a mutiny not to do everything in his power to suppress it.

**Mutsuhito,** *Moot' soo he' to,* (1852-1912), a great Emperor of Japan. In 1868, when about 55 leaders of the Progressive Movement took possession of the imperial palace, Mutsuhito took an oath to establish representative government, to appoint men to office for their ability, not for their rank, and to look for able men to help in the development of Japan. The young ruler quickly accepted Western ideas and became zealous for reforms. In 1869 he married a princess. The traditions and etiquette of Japan require that the sovereign's name and personality be kept in shadow, and his acts are not publicly discussed. Mutsuhito, however, was known as a man of ability, and the tradition of extreme exclusion expected of the Japanese ruler was somewhat broken down by the celebration of the Emperor's 50th birthday and of his silver wedding. In 1887, Yoshihito, a son of the Emperor, was proclaimed heir, and he succeeded to the throne in 1912, on the death of his father. When Mutsuhito began to rule, Japan was dominated by the 16th-century ideas; by his wise statesmanship, vision and courage he helped make her a progressive world-power.




MUTTON

**Mut'ton,** the flesh of sheep. Mutton is a delicately flavored and highly nutritious article of food. After the animals are slaughtered, the dressed carcasses are placed in cold storage for several days to allow the meat to "ripen" before be-

ing placed on the market. Most of the mutton used in the United States is prepared by the packing houses. The diagram shows the cuts into which the wholesale dealer divides the carcass: 1 is the neck; 2, the chuck; 3, the shoulder; 4, the loin; 5, the flank; 6, the leg. Large quantities of mutton are shipped from Argentina and Australia to Europe in refrigerator ships. See MEAT PACKING.

**My Country 'Tis of Thee.** See HYMNS, NATIONAL.

**Myr"iap'oda,** a name once given to the group of Arthropoda that included the centipedes and the millipedes. In the newer classifications the term has been replaced by a more inclusive one and the name has now no scientific significance. In popular use an earwig that is common in southwestern United States is spoken of as a myriapoda.

**Myrmidons,** *Mur' mi dons,* in myths a people of the southern borders of Thessaly who accompanied Achilles to the Trojan War. According to some authorities they were originally ants. The word now signifies the followers of a bold leader or the merciless agents of some ruthless power.

**Myrrh,** *Mur,* a gum exuding from the trunk of a small tree of the Rue Family. The tree, a native of Arabia and East Africa, is low, with ragged, gray bark and thorny branches. The leaves are few and small, and the flowers are inconspicuous but have a strong balsamlike odor. The fruit, which is not much larger than a currant and is an egg-shaped stone fruit, has the same balsamic odor and a bitter taste which lingers in the mouth. The gum, or gum resin, for which the tree is noted, oozes from the bark in oily drops, which grow hard and dark with age. In this form it is put upon the market for use in perfumes, ointments and medicines. The myrrh spoken of in the Bible in connection with frankincense is the product of a tree of an allied genus. This myrrh was among the gifts brought by the Wise Men to Jesus, and earlier it is spoken of as being used in the rites of purification and sacrifice. The so-called myrrh of England is really cicely, a plant of the Parsley Family, called myrrh because its odor resembles that of the Eastern plant.

**Myrtle,** *Mur' t'l,* a tree native in the Mediterranean region and the tropics, belonging to the Myrtle Family and represented in North America only by house plants. The tree has smooth, shining leaves whose peculiar blue-green color has been named myrtle-green; they are long-oval in shape and are evergreen. The leaves as well as the bark and flowers are aromatic and are of use in the manufacture of perfumery and of a condiment. The flowers are single or double and may be white or pink-tinted in color. There are many stamens. The fruit is a black, seedy berry also having a spicy flavor. The low trailing herb, sometimes called myrtle, is really periwinkle, a member of the Dogbane Family.

**Mythology,** *Mi thol' o jy,* the science of myths or the body of myths belonging to any people, as Greek mythology or Norse mythology. The term is also used to denote the literature pertaining to myths. The origin of myths is uncertain, and a number of theories have been advanced to account for them. While many of these theories are of ancient origin, it is only in recent times that systematic attempts have been made to solve the problem of myths. All students of mythology recognize the following facts: (1) that myths are common to all primitive and partially civilized people; (2) that myths are fully believed by those among whom they are used; (3) that among all peoples they attempt to answer the same question; (4) that all myths are easily divided into two classes, those which need no explanation and those which require explanation. Those myths, for instance, which represent the gods and goddesses as wise and good, the embodiment of the highest attributes of character, are rational and need no explanation. On the other hand, those which represent the gods as ruled by the baser passions and as tricky and revengeful require explanation, but satisfactory explanations for this class of myths are not easily found. The ancient Greeks considered

them to be the invention of poets and orators, solely for effect, some going so far as to censure Homer and Hesiod for introducing such tales into their writings. Plato refused to admit Homer's writings in his *Republic* because of the myths they contained.

The latest authorities generally believe that myths are the outgrowth of attempts of primitive peoples to answer their questions concerning the origin of the earth, of the race, of animals, of the placing of the stars, of death and of the existence of the soul after death and many other like questions. Stories were invented to answer these questions, and however absurd or imbecile these stories may appear to civilized men, they were satisfactory and acceptable to the primitive people among whom they originated. These fables were handed down by tradition from generation to generation and became as precious an inheritance to the people of old as are the religious beliefs cherished by the civilized nations of the present day. Doubtless many fables were invented for moral and other effects. The myths most generally studied in schools and referred to in our literature are those of the Greeks and Romans, the Persians, the ancient Egyptians and the Scandinavians.

Greek and Roman Myths. The Romans were an intensely practical people, and they borrowed most of their fables from the more imaginative Greeks, who doubtless imported many of them from Egypt and the East. Greek and Roman mythology explains the origin of all things by supposing that in the beginning there was a boundless space, which they named Chaos. Out of Chaos came Earth (Gæa) and Love. From these came in succession Uranus (Heaven), the mountains, the sea and plants and animals. Two other children of Chaos were Erebus and Nox (Night), and from these sprang light and day. To Uranus and Gæa were born 12 children, collectively known as the Titans. In time Saturn, one of the Titans, overthrew Uranus, and he and his sister Rhea reigned supreme until they in turn were overthrown by Jupiter, the youngest of the Titans. Jupiter divided the Universe by lot. He received the land; Neptune, the sea; and Pluto, Hades, or the lower regions. Juno, the sister and wife of Jupiter, was queen of heaven. Jupiter had his abode on Mt. Olympus, where also dwelt the great gods and goddesses—Apollo, Diana, Juno, Mars, Mercury, Minerva, Venus, Vesta and Vulcan. Ceres, who was also the sister of Jupiter, usually dwelt upon the earth. Upon these beliefs the great system of Greek and Roman mythology, with its many lesser deities, was built. By reading articles on the deities mentioned a more detailed account can be obtained of the various myths of the ancients.

Norse, or Scandinavian, Mythology. Norse mythology was common to all Teutonic peoples. A comparison with Greek and Roman mythology shows that while differing in details the two systems have the same idea as a foundation. This system accounts for the origin of things by supposing that in the beginning there was a vast abyss bounded on the north by mist and on the south by light. In the mist 12 rivers rose and flowed into the abyss, where they were frozen. The heat from the light melted the ice, and from the rising mist Ymir, the father of the giants, and the cow, Audhumla, arose. The cow was nourished by the salt, which she obtained by licking the ice, and the cow's milk nourished Ymir. The god Buri came out of the ice, and from him all the gods were descended. Odin and his two brothers, grandsons of Buri, killed Ymir, and from him formed the earth. There were 24 great gods and goddesses who were immortal and dwelt in Asgard, a realm generally supposed to be above the earth. There were also numerous lesser gods and goddesses, each having special powers and duties. Consult Bulfinch, *The Age of Fable;* Guerber, *Myths of Greece and Rome* and *Myths of Northern Lands.*

# N

**NAGASAKI,** *Nah' ga sah' ke,* a city and port of Japan, situated on a small peninsula in the northwest of the Island of Kiushiu. The harbor forms a favorable anchorage, and it is a stopping place for ships coming to coal, as well as the first port of entry on approaching Japan from the south or the west. The principal exports are cotton goods, marine products and coal; the imports include raw cotton, iron and other metals. Three large docks, a patent slip and the Akanoura Engine Works represent the important industries. In the 16th century Nagasaki became the headquarters of Christianity in Japan, and in 1858, together with four other ports, was opened to British and American trade. Population in 1905, 163,324.

**Nagoya,** *Nah' go ya,* one of the largest cities of Japan, situated upon the Island of Hondo, 170 m. s.w. of Tokyo. It is the capital of its province and is a beautiful and interesting city, well laid out and possessing many places of interest and importance. Among these are a historic castle, several monasteries, temples and an excellent college. The industries include the manufacture of lacquered ware, fans, porcelain, cotton, silks and embroideries. Population, 378,231.

**Na'hum,** one of the books of the Old Testament, the author of which, Nahum, was one of the 12 minor Hebrew prophets. He is thought to have prophesied between the two invasions of Sennacherib. Both date and authorship of the book, however, have been the subject of dispute. The prophecies of the book of *Nahum* foretell the destruction of the enemies of Jehovah and the capture and destruction of the city of Nineveh. See BIBLE, subhead *The Old Testament.*

**Naiads,** *Na' yadz,* in Greek mythology, the nymphs of the springs and of rivers. Caves were sacred to them and were believed to be their dwellings. Because of the medicinal qualities of some springs, the Naiads appear as healing divinities.

**Nail,** in anatomy, a part of the outer skin, with its horny layer highly developed. It consists of a root, a visible, transparent part or body lying on the dermis, with which it is continuous, and a free rim at the tip of the finger or toe. That part of the dermis on which the nail is formed is called the matrix, and the opaque area extending out from it and visible as a half-moon is the lunule. The nail is renewed from the bed of the dermis beneath and is pushed outward from the matrix. See SKIN.

**Nails,** small, slender pieces of metal with round or flattened heads, and generally pointed. They are made of iron, steel or copper and are used for a large variety of purposes, principally for driving into timber or other materials in order to hold separate pieces together. There are at least 200 kinds of nails, the most common being wrought, cut, wire, horseshoe and shoe nails. Nails were originally made by hand, being forged on an anvil from bars of iron made for the purpose and called nail rods. For many centuries this was the only method of making nails, and during the colonial days in America almost every household contained the necessary tools and material for making them. They often passed for currency, like beads among the American Indians. In Birmingham, England, men, women and children were engaged in making nails for many years, by this process. At the present time all nails are made by machinery.

CUT NAILS. Cut nails are made from plates of wrought iron, rolled into flat bars the thickness of a nail and slightly wider than the length of the nail, in order to allow for the material in the head. They are cut tapering by means of a shearing device, which consists of a pair

of powerful and sharp jaws, which seize the bar and bite off just sufficient material of the proper shape to form the nail. A viselike die grasps the nail, and the head is formed by a single blow from a hammer operated by the machine. The nail plate, as the flat bar is called, is held in such a way that it turns alternately to the right and the left after each nail is cut, so that no material is wasted by the tapering of the nails.

Wire Nails. Wire nails are made from steel wire, which is made for the purpose and wound on a reel, from which it is fed into a machine. Automatic devices are arranged in this machine so that the wire is first straightened between rollers, then cut the proper length by cutters. Shears operating from two different directions shear off the end into a point, after which the nail is seized in a viselike die, while a hammer forms the head. One machine will make from 150 to 500 nails per minute, requiring but little attention or labor, the quantity depending upon the size of nails made.

Other Varieties. Copper nails are usually made from wire, and they are used chiefly in ships or boats, since they do not rust. Horseshoe nails are soft and can be readily bent and clinched. While formerly made by hand, they are now made almost entirely by machinery.

Sizes. The sizes of nails are designated by the term *penny,* referring to the number of pounds that 1000 nails will weigh; as, for instance, six-penny nails, ten-penny nails, etc., meaning that 1000 six-penny nails weigh six pounds and 1000 ten-penny nails weigh ten pounds. Large nails are called spikes and small ones are known as brads or tacks, according to their shape. See Iron and Steel.

**Nanaimo,** *Na ni' mo,* a city of Canada in the Province of British Columbia, situated on the eastern coast of Vancouver Island. Steamboats connect it with Vancouver, Sydney and Comox, and the Esquimault & Nanaimo Railway with Victoria. There are five churches, several stores and banks. The Western Fuel Company, having its headquarters in Nanaimo, gives employment to some 600 miners. The export trade in coal and fish is large, the coal being sent principally to San Francisco. The surrounding region is favorable for farming and fruit growing. Population in 1911, 8306.

**Nan″king′, or Nankin,** a city of eastern China famous as the literary center of the republic. It is located upon the Yangtse-kiang about 130 m. direct from its source, and is 580 m. s.e. of Peking, with which city it has direct connection by means of the Yangtse-kiang and the Imperial Canal. A wall divides the portion of the city occupied by the Manchus from that of the Chinese. Nanking is noted for its manufacture of paper, cannon, artificial flowers, crape, China ink and "Nankeen" cloth. Its most interesting buildings are the "tomb of the kings" guarded by huge armed figures, the government house, the royal printing house, a large arsenal and the observatory. Nanking is now a treaty port, but is not yet of great importance for its foreign commerce. Population, 267,000.

**Nansen,** *Nahn′ sen,* **Fridtjof** (1861- ), a Norwegian scientist and Arctic explorer, born at Fröen and educated in Christiania University, where he made a special study of zoology. At the age of 21 he made a voyage to the waters around Greenland. On his return he was appointed curator of the Bergen Museums. During the next four years he wrote a number of papers on zoological and histological subjects, some of which attracted wide attention. In 1887 Nansen began preparations for an expedition across the ice fields which cover the interior of Greenland, and the following summer he undertook the expedition. Greenland was crossed successfully, though the party suffered almost incredible hardships. The company spent the winter on the west coast of the island among the Eskimos. On his return to Norway in 1889, Nansen published two works as the result of this expedition. They were *Eskimo Life* and *The First Crossing of Greenland.*

Nansen's greatest contribution to geography, however, was the result of his

polar expedition in the *Fram,* 1893-96. His study of the sea during his former expedition convinced Nansen that there was a drift current from Bering Strait and the vicinity of the New Siberia Islands to the east coast of Greenland. He believed, therefore, that if a ship were fixed in the ice north of Eastern Siberia it would drift with the current. The *Fram* was constructed for great resistance to ice pressure, and the experiment proved the correctness of the theory. When satisfied that the *Fram* would drift as he had anticipated, Nansen and one companion, Johansen, attempted to reach the Pole. They attained 86° 14′ N., the highest latitude that had then been reached, when they were compelled to turn back. After spending the winter on Franz Josef Land, they were taken home by the Jackson-Harmsworth Expedition, reaching Norway in August, 1896. The *Fram* arrived a little later. Upon Nansen's return he received the highest honors of the learned societies and universities of Europe and America. His *Farthest North* is a popular narrative of the expedition. *The Norwegian North Polar Expedition, 1893-1896; Scientific Results* is a more elaborate treatment of the scientific results attained. In 1906 Nansen was appointed minister to England, and in 1908 he became professor of oceanography in Christiania University. See POLAR EXPLORATIONS.

**Nantes,** *Nants,* a city of France, capital of the Department of Loire-Inférieure, situated on the River Loire, 215 m. s.w. of Paris and at the junction of the Erdre and the Sèvre-Nantaise rivers. The city is built upon the banks of the rivers and on numerous islands, which are connected by bridges. The prominent buildings include the Cathedral of St. Pierre, the Hôtel de Ville, the Palace of Justice, the Church of St. Nicholas and museums of paintings and natural history. The Place Royale of Louis XVI is one of the most noted open places in the city. Nantes contains a number of monuments celebrated for their sculpture. The educational institutions include hydrographical schools, schools of agriculture and numerous learned and industrial societies. The public library contains about 200,000 volumes, and the city maintains an observatory and a botanical garden. The leading industries include shipbuilding and the manufacture of textiles, soap, machinery, glass, chemicals, metal wares, pottery and distilled liquors. Large ships reach the city through a canal, and an extensive foreign trade is carried on. In the Middle Ages Nantes was the capital of Brittany. It was from here that Henry IV issued the Edict of Nantes in 1598. Population in 1911, 170,535.

**Nantes, Edict of,** a proclamation issued by Henry IV of France, Apr. 13, 1598. Its object was to give religious liberty and legal status to the Huguenots, or Protestants, of France. This celebrated Edict granted the Huguenots the right of worship, of holding office, of having a Protestant chamber in the Parlement of Paris and joint chambers in the local Parlements. In 1685, Louis XIV revoked this Edict. Thousands of loyal French, mostly of the middle class, were driven into exile, and England and Germany were enriched at the expense of France.

**Nanticoke,** *Nan′ ti koke,* **Pa.,** a city of Luzerne Co., 8 m. s.w. of Wilkes-Barre and 80 m. n.e. of Harrisburg, on the North Branch of the Susquehanna River opposite West Nanticoke, and on the Pennsylvania and the Central of New Jersey railroads. It is situated in the Wyoming Valley, which is noted for its fields of anthracite, and is chiefly engaged in mining, but has large silk and hosiery mills, agricultural-implement works, flour and grist mills, a canning factory, lumber mills and cigar factories. The town was settled in 1850-55 and incorporated as a borough in 1874. Population in 1910, 18,877.

**Nantuck′et Island,** an island off the coast of Massachusetts, e. of Martha's Vineyard, about 15 m. long and the largest of a group of islands constituting Nantucket County. It is about 20 m. from the mainland and has an area of 51

sq. m. Nantucket, the county seat, is the chief town, and was formerly noted for its extensive whale fisheries. It has a deep harbor, but is now of importance only as a summer resort.

**Naphtha,** *Naf' tha,* a colorless, volatile and highly inflammable oil obtained by distillation from petroleum and such substances as India rubber, asphalt, bituminous shale and coal tar. That obtained from crude India rubber is called caoutchouc naphtha, while that from coal is coal-tar naphtha. Petroleum naphtha is sold as such, or is redistilled and the lighter oils of gasoline and benzine are separated from it. Methyl alcohol, or wood alcohol, is sometimes called wood naphtha. Shale naphtha is distilled from bituminous shales. Naphtha is used as a solvent and in the manufacture of paints and varnishes, as a burning fluid for illumination, and, when mixed with benzine, for gasoline engines. See PETROLEUM.

**Napier,** *Na peer',* **Sir Charles James** (1782-1853), a British general and statesman, born at Whitehall, London. He was the son of Col. George Napier, who had him gazetted an ensign in the 33rd regiment in 1794. Three years later he was appointed aide-de camp to Sir James Duff, and in 1800, lieutenant in the 95th Rifle Brigade. In this capacity he was trained under the immediate supervision of Sir John Moore. After serving in the Danish campaign of 1807, having become major in the 50th regiment, he was ordered to Portugal. Here, at the Battle of Corunna, he received the commendation of Sir John Moore for his gallantry in leading the advance of his regiment. Napier was seriously wounded and was taken prisoner, but was allowed to return to England, where he remained until his exchange was effected.

After further service during the Napoleonic wars and in the War of 1812, Napier entered the military college at Farnham. Having completed his military education, he was, successively, inspecting field officer at Corfu, and governor and military resident at Cephalonia. He retired from military employment in 1830, but was appointed major-general in 1837 and the following year was made a K. C. B. In 1842 he was ordered to Sindh, India, then in a very turbulent state, and in two brilliant victories, at Miani and Hyderabad, succeeded in destroying the power of the ameers. His subsequent administration was very successful, but he quarreled with the directors of the East India Company, and retired in 1847. His last years were spent near Portsmouth, England, where he devoted himself to literary work. Napier was brave almost to rashness, and, though inclined to quarrel with his superiors, was one of the most remarkable military men of his time.

**Naples,** *Na' p'lz,* a city in southern Italy, the largest in the kingdom, formerly the capital of the Kingdom of the Two Sicilies, situated on the northern shore of the Bay of Naples, about 120 m. s.e. of Rome. Its site vies with that of Constantinople in being the most beautiful in the world. It is built in part on the shores of the beautiful bay; in part it climbs the surrounding amphitheater of hills. Above all, in gloom and grandeur, looms the massive Vesuvius. The older part of the city has crowded streets, where festivals, processions, and peddlers and the true Neapolitan life in all its noisy gayety can be seen. To the west the streets are wide and the buildings are modern. The prominent buildings are the Cathedral, the Castello Nuovo, the Castello dell' Ovo, the Castello Sant' Elmo, the churches of San Paola Maggiore, San Domenico Maggiore, the Annunziata and about 400 others, the university, the National Library, an engineering school, opera houses and theaters, a national museum, several hospitals, charitable institutions and schools.

The manufactures are important chiefly because of their number; they include ships, locomotives, stationary engines, cars, linen and silk products, cotton, woolens, china, artificial flowers, perfumery, soap and musical instruments. The commerce is of greater importance, steamship communication being maintained with almost all parts of the world.

Fruits, nuts, paper, hemp, wine and brandy are the principal exports. Naples was originally a Greek colony, and was successively in the hands of the Romans, the Ostrogoths and the Byzantines; in 1130 it was recognized as the metropolis of the Kingdom of the Two Sicilies. The ravages of cholera in 1884 brought about an effort to relieve the miserable conditions of the unsanitary slum districts, and extensive improvements were effected. Population in 1901, 563,540.

**Naples, Bay of,** an inlet of the Mediterranean Sea on the southwest coast of Italy. Its mouth is 22 m. wide and extends from Cape Miseno on the northwest to Cape Campanella on the southeast. Naples, Pozzuoli, Portici and a number of other cities are on the shores. Back of the cities are Vesuvius and Monte Sant' Angelo, which add much to the scenery. The Bay of Naples is considered to be one of the most beautiful bodies of water in the world.

**Napoleon I** (1769-1821), Emperor of the French. He was descended from the patrician Italian family of Bonaparte, and was born at Ajaccio, Corsica, the son of Carlo Bonaparte, an advocate of some repute (See BONAPARTE). He entered the royal military school at Brienne in 1779, and in 1784 was sent to the military school at Paris. In 1785 he closed a scholastic career which had been creditable but not brilliant, and entered the artillery service, becoming lieutenant the following year.

When the French Revolution broke out he chose the popular side, although most of his fellow officers of Valence, where he was stationed at the time, sided with the Royalists. In 1793, having been made a lieutenant-colonel of artillery, he set out to assist in the reduction of Toulon, then in the hands of the English; and it was his strategic plan of attack that led to the capture of the place. For this service he was made brigadier-general of artillery. He again came into prominence in 1795 when the mob in Paris threatened to attack the National Convention. With only one night for preparation, and with a force of only 5000 troops, he defeated the National Guards, 30,000 in number, disarmed the populace, and secured victory for the Convention, which rewarded his services by giving him the command of the Army of the Interior.

CAMPAIGN IN ITALY. In February, 1796, the Directory put Napoleon in command of the Army of Italy. A few days later he married Josephine, widow of Alexandre de Beauharnais. Proceeding to Italy against the forces of Austria and Sardinia, numbering 75,000 men, Napoleon by a succession of brilliant victories and rapid campaigns with his army of 40,000 forced Austria to sign the Treaty of Campo Formio in 1797, exceedingly favorable to France, while peace treaties were also made with Modena, Parma and Naples, and the Pope was compelled to yield part of his dominions.

CAMPAIGN IN EGYPT AND SYRIA. Napoleon returned to Paris, the idol of France; indeed his popularity was so great that the Directory feared his ambition and gladly commissioned him to carry war into Egypt, as a preliminary step of crippling England by the conquest of British India. His victories at Alexandria, the Pyramids and Cairo were made fruitless by the naval victories of the English under Nelson, which cut off his means of returning to France. He then proceeded into Syria, and was everywhere victorious except at Acre, where he was compelled to abandon the siege.

FIRST CONSUL. Returning to Egypt and thence to France late in 1799, he found the Directory very unpopular, the credit of the government gone, and his brilliant work in Italy largely undone. Securing the cooperation of Moreau and the other generals in the capital, he abolished the Directory on the 9th and 10th of November, 1799. A new constitution was then drawn up and promulgated, providing for a government by three consuls, known as the Consulate. Napoleon was made first consul for a period of ten years; and, as he had the power of appointing to all public offices, pro-

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His genius made and unmade kings and changed the map of Europe.

posing all public measures and exercising jurisdiction over all administrative affairs, civil and military, he was virtual ruler of France.

Napoleon's policy now became more clearly defined: to establish order and prosperity at home, humiliate the enemies of France and extend his own power. Aware that his genius was essentially military, he brought the issue to a head by offering peace to England, Austria and Turkey in such terms that it was rejected; and then resolved to strike the first blow at Austria. Gathering an army of 36,000 men, he crossed the Alps and renewed the glories of his former Italian campaigns by the defeat of Austria, which was forced to sign the Treaty of Lunéville (Feb. 9, 1801); treaties were made with Naples, the Pope, Bavaria, Portugal, Russia, Turkey; and finally the Peace of Amiens (March 27, 1802) settled disputed points between France, England, Spain and Holland. Thus it seemed as if a universal cessation of hostilities had finally come. On Aug. 2, 1802, Napoleon was proclaimed consul for life by decree of the Senate.

EMPEROR OF FRANCE. It was during this period that Napoleon rendered his greatest service to France, by his administration of civil affairs, which was marked by sagacity and energy. A general amnesty made it possible for all exiles to return home; education was fostered, especially the study of mathematics, the physical sciences and those subjects that promoted efficiency in the public service; and, most important of all, he assembled the first lawyers of the nation to draw up a code of civil laws (See LAW, subhead *Code Napoleon*). On the other hand, all appointments were in his hands, even to the mayors of cities, so that no vestige of political liberty remained. He reconstructed the electoral bodies in such a way as to make still further aggrandizement of power possible on his part; and on May 18, 1804, he assumed the title of Emperor, over 3,000,000 popular votes ratifying his action.



Meanwhile disturbances in Switzerland in 1802 had induced him to undertake armed mediation in its affairs. England had declared war in 1803, claiming an infringement of the Treaty of Amiens. By 1805 England had succeeded in forming against Napoleon a coalition of European powers, including England, Russia, Austria and Switzerland. Napoleon marched against Austria with the army he had collected for the invasion of England, 180,000 strong, and forced Mack, the Austrian general, to capitulate at Ulm. The next day the fleets of France and Spain were defeated by Nelson at Trafalgar, making England mistress of the seas (See TRAFALGAR); but Napoleon completely routed the combined Austrian and Russian armies at the Battle of Austerlitz on Dec. 2, 1805 (See AUSTERLITZ, BATTLE OF). As a consequence Russia retired from the contest, and Austria immediately sued for peace, giving up all her Italian and Adriatic territory. Prussia gained Hanover for her neutrality. Joseph Bonaparte was made King of Naples, and the Batavian Republic was changed to a dependent kingdom, with Louis Bonaparte as its leader under the title King of Holland. Still more important, however, was the forming of the Confederation of the Rhine and the breaking up of the Holy Roman Empire. This, Napoleon accomplished by reducing the number of states comprising the Germanic system to about 40, and absolving the feudatories of the Holy Roman Empire from their allegiance to the Emperor, who laid aside his imperial crown and used as his highest title, Francis I, Emperor of Austria.

This and the proposal to restore Hanover to England led Prussia, hitherto neutral, to declare war against France in October, 1806. Napoleon defeated the enemy at Jena, on the same day that one of his generals, Davout, gained a brilliant victory at Auerstädt. The French army entered Berlin in triumph, and here Napoleon issued his celebrated Berlin Decree, prohibiting commercial intercourse between Continental ports and

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England, whose commerce he thereby hoped to destroy. His policy of injuring England's commerce is known as the Continental System. He then marched north against Russia, whose army was advancing to assist Prussia, and on June 14, 1807, won the Battle of Friedland. By the Treaty of Tilsit, signed in July, Prussia was stripped of half her territory, out of which the new Kingdom of Westphalia was made, with Jerome Bonaparte as king; the Duchy of Warsaw was erected into a kingdom and given to the King of Saxony; Russia agreed to close her ports to British trade, but received a part of Prussian Poland, and by secret articles was allowed to seize Finland from Sweden.

Napoleon's only open foe now was England, which the Berlin Decree had antagonized but not injured. Indeed the hardship of the decree fell chiefly upon the Continental commerce, and made it one of the factors in the downfall of Napoleon. When Portugal refused to close its ports, Napoleon sent Junot to occupy Lisbon (Nov. 30, 1807), and the royal family fled to Brazil. The Pope refused to carry out the Continental blockade and to recognize Joseph Bonaparte as King of Naples, and Rome was occupied by the French. Civil troubles now broke out in Spain, and Napoleon sent Murat into the country. The weak King Charles IV resigned his crown to Napoleon, who tried to place his brother Joseph on the throne. The Spanish people rose in revolt, and aided by the English maintained a stubborn resistance for seven years, in what is known as the Peninsular War. In the meantime Austria again declared war, but was crushed by Napoleon at the Battle of Wagram, July 6, 1809, who then entered Vienna and dictated his own terms of peace. In December of the same year he divorced the Empress Josephine, and Apr. 2, 1810, married the Archduchess Marie Louise of Austria. Their son, born March 23, 1811, received in his cradle the title King of Rome.

Napoleon's Downfall. The years 1810-11 marked the height of Napoleon's power. His empire reached from Denmark to Naples, with a population of 42,000,000 people, while his sway was almost undisputed in Italy, Switzerland and the Confederation of the Rhine. But the tide now began to turn. His arbitrary rule and summary disposal of kings and kingdoms, together with the devastation of homes caused by perpetual war and the raising of army after army, were beginning to arouse the people as well as the monarchs of Europe. He had, in fact, met his first check in Spain. In 1812 Russia refused to obey the Berlin Decree, and Napoleon invaded the country. He was successful in his battles, but entered Moscow Sept. 14 only to find it deserted. Two days later the city was burned, and retreat became inevitable. The bodies of the French soldiers strewed the long line of that terrible retreat, overcome by cold, famine, disease and fatigue. Only 25,000 men returned of the magnificent army of 650,000 that had undertaken the campaign. Soon after the crossing of the River Beresina, Napoleon hurried on to Paris, leaving the army in charge of Murat, and immediately began to gather another army to meet his enemies.

All Europe was now aroused, and a sixth coalition was formed against him early in 1813, composed of Prussia, Russia, England, Sweden and Spain; and later, Austria. Napoleon won the battles of Lützen, Bautzen and Dresden against the allies; but was forced to retreat to Leipsic, where he was defeated in the "Battle of the Nations" Oct. 16-19, 1813. He still maintained the unequal fight, however, gathering another army with a fertility of resource and genius for organization truly marvelous, and defeated the allies again and again. But he was finally crushed by numbers, the fortifications of Paris were taken March 30, 1814, and the next day Wellington and Alexander marched into the city.

Napoleon abdicated in April. He was allowed the Island of Elba, with the title of Emperor and a revenue of 6,000,000 francs. Ten months later he escaped

from the island, and by his triumphal march on Paris surprised the allies, who were still trying to come to some agreement respecting the disputed boundaries of Europe. He won the victory of Ligny against Blücher; but the French army was completely crushed at the famous Battle of Waterloo, June 18, 1815, and Napoleon's power was forever broken (See WATERLOO, BATTLE OF). He gave himself up to the English, and was sent to the island of St. Helena, where after six years of lonely brooding he died May 5, 1821. He was buried on the island, but his remains were taken to Paris in 1840 and placed beneath the dome of the Hôtel des Invalides.

**Napoleon III** (Charles Louis Napoleon Bonaparte) (1808-1873), Emperor of the French from 1852 to 1871. He was the third son of Louis Bonaparte, brother of Napoleon I and King of Holland, and of Hortense Beauharnais. After the death of his cousin, the Duke of Reichstadt, he became the recognized head of the Bonaparte family, and from this time on he endeavored to obtain possession of the throne once occupied by Napoleon I. After several futile attempts, he found his opportunity in the July Revolution of 1848, resulting in the abdication of Louis Philippe and the establishment of the Second Republic. Louis Napoleon was elected to the presidency on Dec. 10, 1848. Three years later, a contest having arisen between the President and the National Assembly, the former caused the arrest at night of the most prominent deputies in opposition to him, and of other popular leaders in Paris. The next day, Dec. 2, 1851, the city was placarded with notices of the dissolution of the Assembly and announcements of a new constitution to be submitted to popular vote. The people sustained the action of the President by a huge majority, and extended his term of office to ten years. By a similar method he had himself proclaimed Emperor Napoleon III on Dec. 2, 1852, and the Second Empire was established.

Napoleon's rule was marked by three important European wars—the Crimean (1853-56), the Austro-Sardinian (1859) and the Franco-German (1870-71). In the Crimean War he befriended Sardinia, struggling for Italian freedom, and he encouraged Cavour in the furtherance of his plan for Italian unity (See CAVOUR, CAMILLO BENSO DI). He also agreed to support Sardinia in case of Austrian aggression. Although the allies won decisive victories over Austria in the war which followed, Napoleon selfishly entered into negotiations of peace with Francis Joseph, Emperor of Austria, before the cause of United Italy was won. Shortly after, the Civil War broke out in the United States, and Napoleon took advantage of the difficulties of the American Government by attempting to realize his uncle's dream of a Latin-American empire under the protection of France. Maximilian, Archduke of Austria, was placed at the head of Mexico, with the title of Emperor, but after the Civil War the United States succeeded in defeating Napoleon's designs (See MONROE DOCTRINE).

In 1870 the French were called upon to face the Franco-German War. Napoleon was obliged to recall his troops from Rome, and Italy was enabled to complete the work of national unity. The decisive victory of Germany in this war resulted in the downfall of the French Empire and in the establishment of the Third Republic. Napoleon was captured at Sedan (Sept. 2, 1870), and after the conclusion of peace he sought refuge in Kent, England, where he remained until his death. His only child, Prince Eugène Louis Jean Joseph, was killed in South Africa at the age of 23.

**Narcissus,** *Nar sis' us,* in Greek legend, handsome son of the river god, Cephissus. He fell in love with his reflection in a stream. Pining away from this fruitless passion, he was changed, at length, into the flower that bears his name. This was in punishment for his having repulsed various nymphs and maidens, notably, Echo.

**Narcissus,** or **Poet's Narcissus,** a handsome cultivated plant of the Amaryllis Family, loved for the stately

beauty of the flowers. The plant is practically stemless, for the flower stalk and the long, narrow leaves arise directly from a coated bulb. The flowers are borne singly upon the stem and are gen-

NARCISSUS

erally white, but above the six-parted corolla is a crown, which may be golden, crimson or only slightly marked. The edges of the crown are wavy and delicate and within its cup are the six golden stamens. The narcissus has a delicious fragrance and is a favorite greenhouse plant; many variations have been produced by floriculturists. Its name is taken from the legend of the youth, Narcissus, who so admired his own reflection in the stream that he was changed into the flower bearing his name.

**Narcotic,** *Nar kot' ik,* a term applied to any drug which, when given in small doses, relieves pain, induces sleep and diminishes susceptibility. Large doses sometimes produce stupor, unconsciousness or convulsions and result fatally. Some narcotics, such as tobacco and alcohol, have the effect of temporarily stimulating the nerves, but continued use of them causes those organs to break down from overexertion. Belladonna, opium and cocaine are among the best examples of narcotics.

**Nar"ragan'sett Bay,** an inlet of the Atlantic Ocean, extending along the eastern coast of Rhode Island. The largest islands it contains are the Conanicut, the Rhode Island and the Prudence. The principal ports are Newport at its entrance and Providence at the head of the bay.

**Narvaez,** *Nar vah' athe,* **Pánfilo de** (about 1478-1528), a Spanish warrior. In 1501 he went to Santo Domingo and thence to Cuba, and as chief lieutenant to Velásquez, attempted to supersede Cortez in Mexico, but failed. In the summer of 1527 he sailed from Spain to conquer Florida. Being detained in Cuba, he left that place in 1528, and, landing at Tampa Bay in April, claimed the surrounding country for Spain. His cruelty to the natives resulted in his being betrayed by Indian guides. He finally put to sea, but after cruising about the Gulf for months his company was destroyed.

**Narwhal,** *Nahr' hwal,* a large Mammal of the Dolphin Family, inhabiting the Arctic and northern Atlantic oceans. It is distinguished from other members of the family by having no dorsal fin. The males are further differentiated by the presence of a long, twisted tusk which proceeds from the upper jaw and is used as a weapon of defense; very infrequently a two-tusked variety is found. The narwhal is gray above and white underneath; it is among the largest of the dolphins, occasionally attaining a length of 20 ft. The flesh is prized by the Eskimo and the tusk yields a superior quality of ivory. See DOLPHIN.

**Naseby,** *Naze' by,* **Battle of,** a battle between the army of Charles I of England and the Parliamentary force of Cromwell and Fairfax, fought June 14, 1645. Charles's army was completely defeated. The battle takes its name from the parish of Naseby in Northamptonshire, where the engagement occurred.

**Nash'ua, N. H.,** a city and one of the county seats of Hillsboro Co., 14 m. n.w. of Lowell, 33 m. s.e. of Concord and 38 m. n.w. of Boston, on the west bank of the Merrimac River, at the mouth of the Nashua, and on several divisions of the Boston & Maine Railroad. Electric car lines also connnect the city with Boston, Concord, Manchester, Lowell, Hudson, Litchfield, Tyngsboro, Pelham, Dracut and other cities and towns. The city is in the midst of a beautiful hill country. The extensive water power is obtained from the Nashua River and Salmon Brook by means of a canal three miles long and eight feet deep. The city contains a United States fish hatchery, a public library, Federal Building, courthouse, state armory, soldiers' monument, two academies, two hospitals and a number of large churches. Nashua is actively engaged in manufacturing and is noted for its large cotton mills. There are manufactories of boots and shoes, stationary engines, refrigerators, sash and blinds, ice-cream freezers, carpets, cards, glazed paper, hardware, iron and steel products, saddlery, shears, clippers, edge tools, undertaking supplies and furniture.

Nashua is one of the oldest interior settlements of the state. When the boundary between Massachusetts and New Hampshire was settled in 1741, this portion of territory was transferred to New Hampshire. In 1746 it was incorporated as a village under the name of Indian Head. In 1836 the name of Nashua was adopted. The first stagecoach was run through here from Boston to Amherst in 1795. The first cotton mill was erected in 1825. Nashua was granted a city charter in 1853. Population in 1910, 26,005.

**Nash'ville, Tenn.,** the capital and county seat of Davidson Co., situated in the central part of the state on the Cumberland River, 186 m. s.w. of Louisville and about 475 m. n.e. of New Orleans. It is on the Louisville & Nashville, the Tennessee Central, the Nashville, Chattanooga & St. Louis and other railroads, and is connected by interurban lines with adjacent cities and points of interest. Seven bridges cross the river, and the local street-railway system is excellent.

Streets, Boulevards and Parks. The undulating hills and the broad curving river form a picturesque setting for this beautiful Southern city. Within its limits are nearly 200 m. of paved streets, lined with some of the wealthiest homes of the South and with modern business blocks. There are 13 of these macadamized streets, which radiate from the city and are highways of traffic that reach far into the surrounding country. The park system is extensive and includes Glendale Park, a place of great natural beauty; Centennial Park, established in 1897 to commemorate the admission of the state into the Union; Shelby Park, fronting the river; Watkins Park; Cumberland Driving Park; and the State Fair Grounds, where the annual state fairs are held. Together the parks and parkways occupy over 350 acres of ground.

The cemeteries of Nashville are beautifully situated and excellently cared for. Mt. Olivet cemetery has the graves of 2000 Confederate soldiers and a fine monument in their honor. The National cemetery lies north of the city and has the graves of over 16,000 Federal soldiers, the names of many of whom will never be known.

Public Buildings. The most conspicuous of the public buildings is the state capitol, situated on an elevation which makes it overtop neighboring buildings; its grounds are attractive with shrubbery, walks and statuary. Among the many other interesting buildings are the public art gallery in Centennial Park, housed in a building that is an exact replica of the Parthenon; the History Building in

the same park and, in general, resembling the Erectheum; the county courthouse; a Carnegie library; the United States Custom-House; a large union station; the state penitentiary; the governor's mansion, owned and reserved by the state as the home of the governor; and many beautiful churches, including a fine cathedral. Among the buildings owned by various organizations of the city are the Masonic Temple, new Y. M. C. A. and Y. W. C. A. buildings, the Young Men's Hebrew Association Building and the homes of the Elks', the Eagles', the Hermitage, the Standard Country, the Golf, the Commerce and the Country clubs. There is a St. Thomas Infirmary and excellent hospitals. Not far out from the city are The Hermitage, the old home of Jackson; and Belle Meade, once the home of Secretary of War Dickinson and now noted as the place where famous trotters are bred. The ruins of Ft. Negley, built during the Civil War, are on the summit of a near-by hill. The former home of President Polk has been replaced by a modern apartment house, known as Polk Flats.

Educational Institutions. Nashville is one of the foremost educational centers of the United States and has more than 50 institutions of learning aside from its excellent public schools. Among its notable schools are Vanderbilt University, named in honor of Cornelius Vanderbilt; the University of Nashville, now also including the George Peabody College for Teachers; the medical and dental departments of the state university; Ward Seminary, Buford, Boscobel, Belmont and Radnor colleges; Walden University, Roger Williams University, and Fisk University for negroes; a state school for the blind; a new high school and several Catholic schools and business colleges. Peabody College has a historical interest in that its main building was occupied as a barracks by the Federal troops during the Civil War.

Chief Industries. The many railroads and the excellent facilities for navigation, combined with the natural wealth of the surrounding country, have made Nashville an important commercial center. It has a large retail and jobbing business, and its flour mills make it one of the great milling cities of the United States. The encircling forests produce oak, poplar, chestnut, hickory and ash, and woodworking, lumbering and the manufacture of flooring and furniture are important. Its other factories produce automobiles, boots and shoes, baking powder, stoves, fertilizers, iron beds, electrical fixtures, snuff, harness, boxes, trunks, clothing, bags, drugs, dustless furnaces and many other articles. The city is also a noted market for live stock.

History. Nashville was settled by a company of pioneers under the leadership of James Robertson, and was named Nashborough in honor of Governor Nash of North Carolina. When incorporated in 1784, the name of the town was changed to Nashville. It became a city in 1806 and the capital of the state in 1843. In the Civil War, Nashville was Confederate until 1862, when it was captured by the Union troops. The Battle of Nashville was fought between the armies of Thomas (Union) and Hood (Confederate) in 1864, but left Nashville in possession of the Union troops. Nashville has had a steady growth and is one of the foremost southern cities. It has a commission form of government and owns its own waterworks and electric-lighting plant. Population in 1910, 110,364.

**Nashville, Battle of,** an important engagement of the Civil War, fought at Nashville, Tenn., Dec. 15 and 16, 1864, between 50,000 Federals under Thomas and 26,000 Confederates under Hood, including cavalry under Forrest. Three months previous Hood had evacuated Atlanta and, by marching northward, had hoped to prevent Sherman's proposed march to the sea. Realizing Hood's purpose, Sherman had sent Thomas to Tennessee to deal with him, and Hood had followed Schofield to Nashville, where Thomas held the main army in the heights within and immediately sur-

rounding the city. Arriving before Nashville on Dec. 2, Hood challenged to battle; but Thomas waited two weeks, during one of which both armies were ice-bound. He was threatened with removal for this delay, and Grant became so impatient with him that he set out for Nashville in person.

Finally, Dec. 15, Thomas came out from behind his intrenchments, and after a two days' fight the Confederates were almost surrounded, and forced to a retreat which soon became a rout. At Brentwood, about four miles distant, the troops were somewhat collected, encamping there for the night; but the Confederate Army of the Tennessee was never again organized, and Hood asked to be relieved of his command. This was one of the most brilliant victories of the war, and destroyed the power of the South west of the Allegheny Mountains. It is agreed that the tactics employed by Thomas at Nashville were perfect, and his plan is the only one of the Civil War now studied as a model in European military schools.

**Nast, Thomas** (1840-1902), an American caricaturist, born in Landau, Germany. His family moved to the United States when he was six years old. When he was but 14 years of age he became a draftsman on *Frank Leslie's Illustrated Newspaper*. In 1860 he went to England and to Italy, and followed Garibaldi, making sketches of his war, which appeared in the *New York Illustrated News, The Illustrated London News* and *Le Monde Illustré*. In 1862 he began making war sketches for *Harper's Weekly,* and in 1872 began the publication of *Nast's Illustrated Almanac*. He illustrated *The Tribute Book,* Nasby's *Swinging 'round the Cerkle,* Dickens' *Pickwick Papers* and other works. He was the originator of the Republican elephant, the Democratic donkey and the Tammany tiger. In 1894 he was connected with the *Pall Mall Magazine*. In 1902 he was appointed consul-general to Guayaquil by President Roosevelt. His pictorial satire did much to correct many gross evils in public life, and was largely instrumental in breaking up the Tweed Ring of New York City. He also produced some very good oil paintings.

**Nasturtium,** *Nas tur' shum,* a common ornamental plant of the Geranium Family, planted along flower borders or near walls and fences. In the United States there are two common varieties whose chief difference is that one is a short, creeping or prostrate herb, while the other climbs sometimes to great height. The stems of the nasturtiums are slender and have a biting, pungent juice which makes them popular in salads and as a garnish. The leaves are thin, light green in color and almost circular in form, with the stem joining them near the center. The flower is made up of five irregular petals, the two upper being somewhat apart from the three lower and continued below the calyx in a long, hooked claw. These flowers are showy and are produced in all shades of yellow, orange and pure red or in mottled or striped variations. Its globular, seedy pods are pickled and used as a substitute for capers. Horseradish is technically known as nasturtium. The nasturtium is a native of Peru, where it grows abundantly in the woods and fields.

**Natal,** *Na tahl',* since 1909 a province of the South African Union. See South Africa, Union of.

**Natchez, Miss.,** a city and the county seat of Adams Co., about 100 m. s.w. of Jackson, on the Mississippi River and on the St. Louis, Iron Mountain & Southern, the Yazoo & Mississippi Valley, the New Orleans & Northwestern and other railroads. Steamboats connect the city with the entire Mississippi Valley, and an extensive commerce is carried on. Cotton, which is cultivated on a vast scale in the surrounding region, is the leading article of export, approximately 100,000 bales being shipped annually. Among the manufactures are cotton goods, cottonseed oil and cake, yarn, rope, brick, lumber products, drugs and ice. There is also a packing plant. Natchez was the first city in the state to own a municipal sewerage system and waterworks. Prominent among

the institutions of the city are the Natchez Institute; Stanton College (nonsectarian) for girls; St. Joseph's College for girls; the Natchez College for negroes; and, six miles from the city, the Jefferson Military College. The Fisk Public Library, orphanages, hospitals and sanatoriums are important; and Institute Hall, Natchez Hotel, the courthouse, clubhouses and numerous churches and antebellum residences are also worthy of mention.

There are four public parks, three on the river, and Memorial Park of 600 acres in the heart of the city, which is a memorial to Confederate dead. Adjoining the city is a National cemetery. A short distance from the city limits is the former estate of Winthrop Sargent, the first governor of the Territory of Mississippi. At Natchez the festival of Mardi Gras is held annually. The first white settlement on the site of Natchez was made in 1716, when Le Moyne de Bienville built Ft. Rosalie. This fort was destroyed and the inhabitants massacred in 1729. It was rebuilt and renamed Ft. Panmure by the English, who took possession according to the terms of the Treaty of Paris. In 1779 the Spanish took possession and in 1798 the United States dispossessed Spain of it. From 1798 to 1802 and from 1817 to 1821 Natchez was the capital of Mississippi. It received a city charter in 1803. The city was visited by a destructive tornado in 1840. It was shelled by Commodore Porter in 1862, and soon after the fall of Vicksburg fell into the hands of the Federals, who occupied it until the close of the war. Population in 1910, 11,791.

**Na'tick, Mass.,** a town of Middlesex Co., including several villages, 17 m. s.w. of Boston, on the Charles River and on the Boston & Albany branch of the New York Central Railroad. There are extensive manufactories of baseballs, woodenware, clothing, boots and shoes, edge tools, supplies for athletic games, saws, shirts and other articles. The educational institutions include the Morse Institute, the Walnut Hill School for young ladies and the Bacon Library. The place was founded by John Eliot about 1651, and from that time until the founder's death was used chiefly as a home for converted Indians. It was incorporated in 1781. Population in 1910, 9866.

**National Academy of Design,** a society of artists in New York City. Professor Morse, the inventor of the telegraph, became its first president in 1828. Membership is limited to artists, and in number does not exceed 100. Instruction is offered in designing, painting, etching, still life and allied subjects. Annual exhibitions are held and prizes offered for work of artistic value.

**National Academy of Sciences,** an organization for the purpose of furthering scientific experimentation and research. It was incorporated under act of Congress in 1863 and, when required, acts as an advisory body on scientific matters to the government. It meets semiannually, and medals are awarded for excellence in original work.

**National Banks.** See BANKS AND BANKING.

**National Civic Federation.** See CIVIC FEDERATION, NATIONAL.

**National Conventions,** in the United States, political conventions at which the candidates for president and vice-president are nominated. The convention also adopts a set of resolutions, which constitute the platform of the party for the campaign that follows. National conventions are held once in four years and consist of delegates from all the states and territories, each state being entitled to twice as many delegates as it has representatives and senators in Congress. In most states the delegates consist of delegates at large and district delegates. Each state has as many delegates at large as it has senators and representatives at large in Congress. These delegates are chosen by party state conventions. The delegates from congressional districts are chosen by district conventions called for that purpose. As many alternates as delegates are chosen, so that the state may be sure of full representation if any delegate fails to attend.

The organization of the convention is in the hands of the national committee of the party, consisting of one member from each state and territory. Fully six months before the convention is to be held, this committee meets in Washington, selects the place of meeting and makes all other necessary arrangements. At the time of meeting it is also the duty of this committee to decide all contested elections and name the temporary chairman who shall call the convention to order. The selection of a permanent chairman and the necessary clerks or secretaries follows. Then committees are appointed, the most important being the committee on resolutions, which prepares the platform, and the committee on credentials. The convention then adjourns until the committees have prepared their reports. After the adoption of the platform the candidates are nominated and the convention adjourns.

The national convention of today is the outgrowth of the caucus system, which was instituted in the early political history of the country and which was finally employed by the members of Congress to nominate each party's candidate for president and vice-president (See CAUCUS). The national convention is the climax in a series of movements having for their purpose the nomination of party candidates for office, beginning with candidates for local offices, such as township officials, the county and ward officials in the city, and extending from these local centers to the county, the congressional district and the state. Each township and voting precinct in a city has its local party committee. In most states these local committees nominate delegates to their respective county conventions. The county convention, in turn, nominates delegates to the state convention and to its congressional district convention. It also nominates the candidates for the various county offices. The congressional district convention nominates a candidate for representative in Congress, and in most states the delegates to the national convention. The state convention nominates the candidates for state officials and the delegates at large to the national convention. At their meeting at the national convention the delegates from each state choose a member of the national committee for that state, and this national committee attends to calling the next national convention. See ELECTORAL COLLEGE; PRESIDENT; PRIMARY; POLITICAL PARTIES IN THE UNITED STATES.

**National Democratic Party.** See POLITICAL PARTIES IN THE UNITED STATES, subhead *Democratic Party.*

**National Education Association,** an organization of teachers formed in Philadelphia in 1857 as the National Teachers' Association. The organization has grown rapidly since 1870. It was incorporated in 1886 and now maintains about 20 departments, besides the National Council, which acts as an advisory board. The general association holds an annual meeting in July, and the Department of Superintendents holds its annual meeting in February. At the general meeting all departments except that of the superintendents hold meetings. The association publishes an annual report, which contains the proceedings of all the meetings. There are two classes of membership, active and associate; only active members have the right to vote. The active membership numbers about 10,000, and the association is one of the most influential educational bodies in the world.

**National Guard,** the name given to the militia in France organized at the time of the French Revolution. In Paris the Guard had a membership of about 48,000, and it was estimated that there were over 4,000,000 members in France. The National Guard was defeated by Napoleon in 1795, but reorganized by him in 1805. It continued in existence until 1871.

**National Guard of the United States.** See MILITIA.

**National Hymns.** See HYMNS, NATIONAL.

**National Museum of the United States,** a museum established in Washington, D. C., containing some of the most choice collections of historic relics,

animals, plants and other natural objects, in the world. The collections have been secured by the government scientific expeditions, by exchange and by donations. They are housed in an elegant building erected for the purpose, near the Smithsonian Institution on the west side of the Mall. The museum is under the direction of the secretary of the Smithsonian Institution and in direct charge of an assistant secretary, who employs a staff of about 80 helpers. It contains the rarest collection of Indian relics in America. See SMITHSONIAN INSTITUTION.

**National Republican Party.** See POLITICAL PARTIES IN THE UNITED STATES, subhead *National Republican Party.*

**National Road,** a road built by the United States Government from Cumberland, Md., to Vandalia, Ill. It was authorized by act of Congress in 1806, and the original plan contemplated constructing the road only as far as the Ohio River. It was extended by subsequent appropriations, the last being made in 1838. This road was one of the first internal improvements undertaken by the government, and it was strongly opposed on the ground that the appropriation for it was unconstitutional. It is sometimes called the Cumberland Road.

**Natural Bridge,** a bridge formed by the action of water which wears away a soft rock under a layer of harder rock, thus forming an arch through which the stream flows. There are numerous natural bridges in the United States, but the one most widely known is in Virginia, which spans Cedar Creek about 125 m. west of Richmond. The arch has a span of 90 ft. in its broadest part and is 215 ft. high. Four natural bridges of enormous proportions have been discovered in the southern part of Utah. They exceed in size and grandeur any other natural arches in the world, each having spans of several hundred feet and of equal or greater height. These bridges are so located that they are not accessible to the traveling public.

**Natural Gas,** a gas stored in the earth under pressure and valuable for heating purposes. Natural gas occurs in porous rock, where it has been confined under pressure or in chambers enclosed by impervious rock. When wells are bored into one of these chambers or into a layer of porous rock containing gas, it rises to the surface with greater or less force, depending upon the pressure. Sometimes the pressure is so great that it is difficult to close the well so as to prevent waste. While natural gas is usually found in or near regions containing petroleum, it is occasionally found in regions at a distance from oil fields. It has been found in large quantities around Pittsburgh, Pa., in the southern parts of Ohio and Indiana, in the southeastern part of Kansas, in Texas, Illinois, South Dakota, Colorado, Missouri, California and a number of other states. In Canada it occurs in the southwestern part of Ontario and around Medicine Hat and Langevin in Alberta. It is also found around the Caspian Sea and in some places in Africa.

Natural gas is of great value as a fuel, especially in smelting ores and making glass, and its discovery around Pittsburgh and in Indiana led many manufacturers to locate in those regions, but the extensive use has nearly exhausted the supply there. It can be conveyed long distances by pumping through pipes, and it is conveyed to cities in this way and used for heating dwellings and for cooking purposes. With an ordinary burner it gives but little light, but produces a brilliant light when used with a Welsbach mantle. It has also become an important source of gasoline, which is obtained by a process of condensing gasoline vapor occurring in the gas. See PETROLEUM; GASOLINE.

**Nat"uraliza'tion,** the legal process by which an alien may become a citizen of the country of his adoption. In the United States naturalization confers all the rights and privileges of a natural-born citizen, except that a citizen by naturalization cannot hold the office of president. The power to grant naturalization papers is restricted to the United States Circuit and District courts, and other courts of record having a seal, a clerk

and jurisdiction in actions in law and equity in which the amount of the controversy is not limited. The process involves two steps, declaration and application, or petition.

Declaration. At least two years before his application for citizenship, the alien must appear before a court of record having jurisdiction over the district in which he lives and make a formal declaration under oath of his bona fide intention to become a citizen of the United States and to renounce allegiance to any foreign state or power, particularly the one of which he may be a citizen or subject. The declaration must give information covering his name, age, occupation and the time and place of his arrival in the United States. Declaration cannot be made by an alien under 18 years of age.

Application. Not less than two years after an alien has filed his declaration and after not less than five years of continuous residence in the United States, he may make application for citizenship to any one of the courts named above. This application must include his name, place of residence, occupation, date and place of birth, place from which he emigrated, the name of the vessel on which he arrived, the time when he made his declaration and the court before which it was made. If he is married, the application must give the name of his wife, the country of her birth and the place of residence at the time the application is filed. If he has children the date and place of birth and place of residence of each child living must also be given. The application must be signed by the applicant and be verified by affidavits of at least two witnesses who are citizens. The application must be accompanied by a certificate from the department of labor stating the time, place and manner of the applicant's arrival in the United States.

Before the applicant can become naturalized he must declare under oath that he is not a disbeliever in nor opposed to organized government, and that he does not belong to any organization or body of persons opposed to organized government, and that he is neither a polygamist nor a believer in polygamy. He must also be able to speak the English language and declare under oath in open court that he will support the Constitution of the United States, and must renounce any hereditary title of nobility which he may possess.

Children of Naturalized Citizens. The children of persons who have been fully naturalized, being under the age of 21 years at the time of the naturalization of their parents, shall, if dwelling in the United States, be considered as citizens thereof. Children of citizens of the United States born in foreign countries are considered citizens of the United States.

Minors. Any alien under the age of 21 years who has resided in the United States three years next preceding his arriving at that age and who has continued to reside therein to the time he may make application to be admitted a citizen, may, after he arrives at the age of 21 years and after he has resided five years in the United States, including the three years of his minority, be admitted a citizen, but he must make oath that for two years next preceding it has been his express intention to become a citizen.

Prohibitions. The laws of 1882 forbid the naturalization of Chinese, and the courts hold that naturalization cannot be extended to Japanese, Burmese, Hawaiians and Indians.

Suffrage Right. The right to vote is a state gift, while naturalization is a Federal right and is a gift from the Union, not of any one state. In nearly one-half of the states, aliens who have declared intentions may vote; in the others only citizens may vote.

All the principal nations of the world, with the exception of Turkey and Russia, have enacted laws providing for the naturalization of aliens.

**Nature Study,** that line of study which enables the child to become acquainted with its environment. As ordinarily pursued in schools, nature study includes lessons on plants, animals, birds,

insects, the atmosphere, water and the weather. Nature study differs from other branches in that it is not usually taught for a definite length of time and does not require the mastery of a specific amount of knowledge. Its purpose is rather to place the pupil in a sympathetic attitude toward plant and animal life common to his locality and to train his powers of observation. The child studies not from books, but directly from the objects. Some of the work is done in the class under the immediate supervision of the teacher, but much is done out of the schoolroom, either in following the teacher's suggestions or under the stimulus of the child's own interests.

Nature study trains the powers of observation, leads the child to feel an ownership in, and have a love for, plants, animals, birds and insects, checks his tendency to destroy life, removes fear, prejudice and superstition concerning many living things and lays the foundation for the study of the various branches of natural science in the grammar grades and the high school. It originated with Pestalozzi and Froebel, and was urged upon the teachers of America by Horace Mann in the middle of the 19th century. It now constitutes a part of the course of study in both city and rural schools throughout the country. See KINDERGARTEN; MONTESSORI METHOD. Consult Hodge, *Nature Study and Life;* Schumaker, *The Study of Nature;* Payne, *One Hundred Lessons in Nature Study;* C. A. McMurry, *Special Method in Elementary Science.*

**Nau'gatuck, Conn.,** a city of New Haven Co., 28 m. s.w. of Hartford and 5 m. s. of Waterbury, on the Naugatuck River and on a division of the New York, New Haven & Hartford Railroad. It is situated in an agricultural region and has considerable trade in farm products. There are manufactories of knit underwear, copper and brass goods, malleable iron, paper boxes and gas and electric fixtures. Large rubber works are located here. The city contains the Whittemore Memorial Library, Salem School, Sacred Heart Academy and Whittemore High School. Population in 1910, 12,722.

**Nautical Almanac.** See ALMANAC.

**Nau'tilus,** a genus of marine animals related to the cuttlefishes. All species possess shells having a number of chambers, in the largest and newest of which the animal lives. As the nautilus leaves each succeeding chamber it forms a partition separating the old chamber from the new. A small opening through the partition connects all the chambers. It is supposed by some that the nautilus fills these with air or water so that it may rise or sink at pleasure. Other authorities do not agree with this opinion and hold that the nautilus never of its own accord descends below the surface. Most species are found in tropical seas. The paper nautilus, or argonaut, raises its arms above the water so that they look like sails, but they are used when in this position solely to secrete matter for the shell. See CHAMBERED NAUTILUS.

**Nav'aho,** or **Navajo,** *Nav' a ho,* a tribe of North American Indians belonging to the Athapascan family. They live in New Mexico and Arizona and number about 20,000. They have permanent dwellings, breed horses and sheep and raise many agricultural products. They are known chiefly for their skillful and artistic blanket weaving.

**Na'val Academy, United States,** a national school of the United States established in 1845 for the purpose of affording naval instruction. This school is located at Annapolis, Md., on the banks of the Severn River, at the site of old Ft. Severn. The grounds and buildings occupy 50 acres, and outside of these grounds is a park of 100 acres. The school was established by a special act of Congress at the suggestion of the historian, George Bancroft, who strongly urged the measure while he was secretary of the navy. The course requires six years, four to be spent at the academy and two at sea. A cadet has the rank of midshipman until he graduates, when he is given the rank of ensign. The course of study is very thorough in engineering and electrical and ordnance

work. Before graduating, the cadet must know English, French and Spanish, the Constitution of the United States and international law. During the last two years he is trained as an officer. Attendance at the Academy is determined by competitive examination of appointees of the president, two for each senator, two for each representative, two for each delegate in Congress, two for the District of Columbia, five for the United States at large and one for Porto Rico. The president or superintendent of the academy is a naval officer appointed by the secretary of war.

**Naval Militia.** See NAVAL RESERVE.

**Naval Reserve,** naval forces not in active commission in the navy which may be drawn upon in case of need. Ships of the naval reserve consist of those that are undergoing repairs, older and less efficient boats that may be of service, and such vessels as may be drawn from the merchant marine. The personnel of the naval reserve is made up of naval militia stationed at or near seaports, and consisting of about 4000 officers and men. The Spanish-American War called these naval-militia organizations out and proved them to be valuable. Since then there has been an effort to bring them into close contact with the regular naval service. Each battalion is furnished with a training ship where the militiamen are trained by their own officers. There are also many officers and men who have served in the navy and passed into civil life who may be depended upon to reenlist in time of war, and some men may also be drawn from the merchant marine. See NAVY.

**Naval Schools of Instruction,** schools for the training of the officers and men of a navy. These are maintained by all nations having any considerable navy. In the United States such schools are the Naval Academy at Annapolis (See NAVAL ACADEMY, UNITED STATES); the Naval War College at Newport, R. I.; the Torpedo School at Torpedo Station on Goat Island, Newport Harbor, R. I.; and others at Port Royal, S. C., San Francisco, Cal., and near Lake Bluff, Ill. In addition to these schools constant training is given on board all men-of-war. See NAVY; TRAINING SHIP.

**Nav"iga'tion,** the science and art of directing the course of a ship and of finding its position at sea. The navigation of a ship devolves upon the chief officer, usually a captain. Before leaving her dock every ship should be equipped with compasses, a set of mariner's charts, a sextant, a chronometer, leads for sounding and a log for measuring the distance traveled.

The position of the ship is found by two methods, known respectively as "dead reckoning" and "observation." On small bodies of water and on coastwise voyages where the land is constantly or frequently in sight, the ship's position is easily ascertained by observation of well-known objects on the shore, and "dead reckoning" answers every purpose. All courses are reckoned by reference to the north and south line of the compass, and "dead reckoning" consists in ascertaining the distance the ship travels each day and keeping a record of every change in the direction of her course. By comparing these records with navigators' tables, which give the reckonings for all latitudes, the ship's position can be quite accurately determined.

Reckoning by "observation" is employed in the open sea. It consists in measuring the position of certain heavenly bodies, particularly the sun, with the sextant, and from the positions thus ascertained determining the ship's latitude and longitude. The longitude is ascertained by comparing the sun time at noon on the ship with the time indicated by the chronometer, which on English and American ships is set to the time of Greenwich, England. The Nautical Almanac contains navigators' tables, by means of which the exact position of the ship can be determined after the measurements are made. By means of his chart the navigator then proceeds to lay out the ship's course for the next 12 or 24 hours. When entering or leaving large harbors, the ship is usually in charge of a pilot, and its course is fre-

quently marked by buoys. See BUOY; COMPASS, MAGNETIC; LIGHTHOUSE; SEXTANT.

**Navigation Acts,** the name applied to a series of acts passed by the British Parliament between 1645 and 1761 to safeguard English commerce, to injure the Dutch carrying trade and to exploit the British colonies for the benefit of English industry. The earliest navigation act to affect the American colonies, the so-called First Navigation Act, was passed in 1645, made more stringent in 1651 and further strengthened in 1660. This provided that all grown, produced or manufactured produce from any country whatsoever should be brought into England only in English vessels, thus making England the port for colonial staples. A supplementary act in 1663, the Second Navigation Act, was designed to maintain "a greater correspondence and kindness" between the colonies and the Mother Country, and provided that European goods should be shipped to the colonies from England alone and in British vessels. Chief among the few exceptions to this rule were wines from Madeira and the Azores, and salt for the New England fisheries. However, British merchants thus had a monopoly of the trade of the colonies in America. Subsequently duties were imposed upon goods sent from one colony to another if it were possible to secure the same goods in England.

As soon as the manufactures of the colonies began to grow, acts to suppress manufacturing interests were passed, and by 1719 Parliament had condemned colonial manufactures as having a leaning towards independence, while before 1761 some 29 individual laws had been made to curb colonial trade. Of these, one of the most annoying was the Sugar Act, 1733, which provided that sugar and molasses from the West Indies, from which the colonists made rum for exportation, should not be imported.

Owing to the widespread practice of smuggling, which the colonists considered legitimate, the full rigor of this repressive policy was never felt in America. Moreover, various provisions in the acts favored American industry, as the impetus to shipbuilding between 1772 and 1775 proved, while the American producers were granted many exclusive privileges. This commercial policy, however, was strongly denounced by the colonies, and British persistency in the matter was among the causes of the Revolutionary War. See REVOLUTIONARY WAR IN AMERICA.

**Nav'iga"tors' Islands.** See SAMOAN ISLANDS.

**Na'vy,** the warships of a nation taken collectively together with their crews and equipment. Warships were employed by the Greeks, the Phœnicians, the Persians, the Carthaginians and the Romans, among ancient nations. During the Middle Ages, carrying on war upon the water was common to nations having seacoasts. The Vikings in the North, and Genoa and Venice in the Mediterranean, prided themselves upon their navies and the management of their warships. The first warships were galleys propelled by oars, and ships of this style were the only ones used for several centuries. The use of the modern navy began when sails were substituted for oars.

UNITED STATES. The navy of the United States began with the Revolutionary War, when whaling ships and merchant vessels were armed and pressed into service to prevent British ships from bringing supplies to the garrison in Boston. Before the end of the war Congress had 64 ships in service, and they captured or destroyed nearly 200 British ships. The only naval battle of note between American and British ships was that between the *Bon Homme Richard* and the *Serapis* (See JONES, JOHN PAUL). In the war of 1812 the American navy was a credit to the nation and a surprise to Europe, American ships being successful in a majority of their encounters with the British. Between the War of 1812 and the Civil War there was little demand for a navy; hence at the beginning of the latter conflict numerous warships and gun-

boats were hastily constructed to assist the regular ships of the line. Between 1853 and 1860, France and England constructed a few ironclad warships, but there had been no opportunity to test them in battle. In 1861 the United States Government authorized the construction of ironclad ships for coast defense, and the *Monitor,* launched Jan. 30, 1862, was the first of these ships. On March 8 following, the *Monitor* met the Confederate ironclad *Merrimac* in Hampton Roads, Va., and these ships fought the first battle between ironclad ships in the world (See HAMPTON ROADS, BATTLE OF). After that all great powers began to construct ironclad warships.

From the close of the Civil War until 1890, but little was done to strengthen the American navy, but since the latter date, remarkable progress has been made, as shown by the table accompanying this article. The personnel of the navy comprises over 57,000 officers and men. The president is commander-in-chief of the navy. Tactics and strategical matters are in charge of the general board, at the head of which is the admiral. The navy is divided into the Atlantic, the Pacific and the Asiatic fleets. The Atlantic Fleet is divided into five divisions, the Pacific Fleet into two and the Asiatic Fleet into three. Each fleet is under the direct command of a rear-admiral, who is commander-in-chief of that particular division.

OTHER NATIONS. The other great navies of the world are those of Great Britain, Germany, France, Italy and Japan. The Russian navy, which was seriously depleted in the war with Japan, is being rebuilt. A Canadian navy is also under construction. See WARSHIP; NAVY, DEPARTMENT OF THE; NAVAL ACADEMY, UNITED STATES; NAVAL RESERVE.

The following table shows the comparative strength of the great navies of the world at the beginning of 1913:

| Powers | Modern Battleships | Cruiser Battleships | Other Battleships | First-Class Cruisers | Second-Class Cruisers | Third-Class Cruisers | Gunboats | Monitors | Destroyers | Torpedo Boats | Submarines | Personnel Officers and Men |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Great Britain | 47 | 10 | 15 | 41 | 42 | 34 | | | 210 | 58 | 69 | 136,000 |
| Germany | 27 | 6 | 10 | 9 | 14 | 30 | 49 | | 94 | 52 | 11 | 35,500 |
| United States | 29 | | 9 | 15 | 3 | 14 | 21 | 10 | 49 | 32 | 35 | 57,178 |
| France | 19 | | 9 | 15 | 11 | 10 | 14 | | 85 | 185 | 83 | 58,649 |
| Japan | 12 | 4 | 4 | 13 | 7 | 13 | 6 | | 61 | 48 | 17 | 49,389 |
| Russia | 14 | | 3 | 6 | 8 | 2 | 8 | | 103 | 25 | 51 | 46,655 |
| Italy | 12 | | 2 | 7 | 3 | 15 | 13 | | 41 | 78 | 20 | 30,587 |

**Navy, Department of the,** a department of the United States Government organized in 1798 and having charge of the navy and all affairs pertaining to it. The secretary of the navy, a civilian, is at the head of the department, and he is assisted by an assistant secretary, also a civilian. The secretary is appointed by the president and confirmed by the Senate. He is a member of the cabinet and serves during the pleasure of the president, who is commander-in-chief of the navy. The department is organized into a number of bureaus, each having charge of special lines of work. The most important of these are the bureau of yards and docks, the bureau of navigation, the bureau of ordnance, the bureau of construction and repair, the bureau of steam engineering and the bureau of medicine and surgery. The larger bureaus are divided into departments. The Hydrographic Office, the Naval Observatory and all

naval schools are under the supervision of the navy department.

**Navy Yard,** a place for anchorage, repair and construction of warships and naval supplies. Navy yards are maintained by the government. Those in the United States are at New York, Boston, Norfolk, Va., Portsmouth, N. H., Philadelphia, Mare Island (near San Francisco, Cal.), Washington, D. C., and Bremerton, Wash. A navy yard usually contains repair shops, storehouses and a dry dock. The largest dry docks in the United States navy yards are at the New York and Norfolk yards.

**Naz'arite,** the name given by the Jews to one who devoted himself in a special sense to the service of Jehovah. Among the ancient Jews there were two classes, Nazarites for life and Nazarites for a limited period, the latter being subject to the law contained in *Numbers vi:1-21.* Abstinence from wine and allowing the hair and beard to grow were obligatory during the fulfillment of the Nazarite's vow. The Old Testament Nazarites for life were Samuel and Samson.

**Nebras'ka,** THE TREE PLANTER STATE, one of the West North Central States, is bounded on the n. by South Dakota, on the e. by Iowa and Missouri, on the s. by Kansas and Colorado and on the w. by Colorado and Wyoming. The Missouri River forms about one-third of the northern and all of the eastern boundary.

SIZE. The greatest length from east to west is 450 m., the breadth is 208 m. and the area is 77,520 sq. m., of which 712 sq. m. are water. Nebraska is about the size of Ohio and Indiana combined, less than one-half the size of California, almost exactly the size of South Dakota and the 15th state in area.

POPULATION. In 1910 the population was 1,192,214. From 1900 to 1910 there was a gain in population of 125,914, or 11.8 per cent. There are 15.5 inhabitants to the square mile and the state's rank in population is 29.

SURFACE. Nebraska extends from the Missouri River to the foothills of the Rocky Mountains and belongs to the Great Plains region of the United States. The surface in general is that of a rolling prairie sloping gently to the eastward. Through this prairie the rivers have worn deep channels. The lowest point, 842 ft., is in the southeastern corner and the altitude of the eastern third averages about 1000 ft. Along the western border the altitude varies from 3000 to 5000 ft. Wild Cat Mountain, 5038 ft., in Banner County, is the highest point in the state. North of the North Platte, Pine Ridge, a range of low mountains, extends east and west, and in the northwest corner is a section of the Bad Lands, which are more prominent in South Dakota. This region is characterized by ravines and gorges bordered by cliffs and peaks that have been worn into fantastic shapes. It is of great interest to geologists on account of the fossils it contains.

RIVERS. Most of the state is drained directly into the Missouri. The Niobrara flows almost across the state from west to east and enters the Missouri in Knox County. The Elkhorn drains the northeastern part, and the Loup with its tributaries the northern. The North Platte enters the state about midway between its northern and southern boundaries, and flows southeast to join the South Platte, which enters the state from Colorado. The Platte, the largest stream within the state, flows across the south-central part and enters the Missouri between Sarpy and Cass counties. The Republican drains the southwestern part into Kansas, and the Blue, also flowing into Kansas, drains the southeast corner. Some of the streams lose all or most of their water by seepage during the dry season. Water-bearing rock and gravel underlie the hillsides, and artesian wells are obtained by boring into these strata. The wells usually have a strong flow and provide abundant water for domestic purposes and for irrigation.

CLIMATE. Nebraska has a mild temperate climate. The atmosphere is clear, dry and bracing and the winters are

mild, with occasional cold spells when, in the northern part of the state, the thermometer may fall as low as 20° below zero. But the bright sunny days relieve the severity of the temperature. The summers are warm with numerous hot days in which the thermometer may rise to 100°. The nights, however, are cool and the summers are as a whole salubrious. The mean temperature for January is 21.5° and for July 74.5°. The annual rainfall varies from 30 inches in the eastern part of the state to 20 and 15 inches in the western part, with an average of 24 inches for the entire state.

Minerals and Mining. Limestone is extensively quarried for building and other purposes, and quarries are found in nearly all parts of the state. Clay suitable for brick is found in many localities and rock valuable for cement is widely distributed. Sand of excellent quality for making cement rock is shipped in large quantities, and in the southern part of the state are valuable deposits of ocher.

Agriculture. Only one-half of the state is adapted to agriculture without irrigation and the remainder is suited to grazing. Agriculture is the leading industry and furnishes occupation for by far the greater number of inhabitants.

*Soil.* The soil is generally a loam underlaid with sand and gravel. That along the river beds contains a large proportion of alluvium. With the exception of small areas in the north and northwest the soil is fertile, and when supplied with water yields abundant crops.

*Products.* Corn is the leading crop with an average yield of about 250,000,000 bushels. Wheat is next in importance, with a yield of about 50,000,000 bushels. Both winter and spring wheat are grown, but winter wheat is the more successful. Oats and rye follow wheat in order of value. Hay, sorghum, broom corn, millet, alfalfa and sugar beets are all important crops, and garden vegetables are raised in large quantities in some localities. Apples, plums, cherries, peaches, grapes and small fruits are raised successfully, and fruit culture is rapidly increasing.

Live stock is raised throughout the state, but this branch of the agricultural industry receives relatively greater attention in the western part of the state because of the adaptability of this region to grazing. Large numbers of horses, mules, cattle, sheep and hogs are raised for Eastern markets. The state has over 2,000,000 horses and mules and over 3,000,000 sheep. Dairying is an important industry and the total income from dairy products exceeds $9,000,000 a year. The income from poultry and eggs is also about $9,000,000. In some parts of the arid regions there are large irrigation systems and more than 1,000,000 acres are under cultivation. With the extension of irrigation works along the Niobrara River another large section of the state will have its fruitfulness materially increased.

Manufactures. Slaughtering and meat-packing, having its center at South Omaha, is the chief manufacturing industry, and this city ranks third in the country as a meat-packing center. Next in importance is the manufacture of flour and gristmill products. The manufacture of starch, making cars and railway appliances, canning fruits and vegetables, the manufacture of beet sugar and making butter and cheese are all important and growing industries.

Transportation and Commerce. Nebraska has over 10,000 m. of railways. Great trunk lines extend across the state from east to west and these are connected by numerous cross lines running north and south. The leading systems are the Chicago & North Western, the Union Pacific, the Burlington & Missouri, the St. Paul, Minneapolis & Omaha and the Rock Island. Interurban systems are found in the larger cities. Omaha and Lincoln are the chief railway centers.

Live stock, flour, corn, wheat and other agricultural products and packed meats are sent to the Eastern markets in

large quantities and manufactured goods and foodstuffs not raised within the state are imported.

GOVERNMENT. The present constitution was adopted in 1875. The initiative and referendum have since been approved as a part of the constitution. The executive department consists of a governor, lieutenant-governor, secretary of state, auditor, treasurer, superintendent of public instruction, attorney-general and commissioner of public lands and buildings, all elected for two years. The Legislature consists of a Senate of 33 members and a House of Representatives of 100 members. The members of both houses are elected for two years. Sessions are held biennially and are limited to 90 days.

The judicial department consists of a Supreme Court of seven judges elected for six years; District Courts for the 26 judicial districts into which the state is divided, and in each of which a judge is chosen for four years; and County Courts, which have probate and limited criminal and civil jurisdiction. County judges are elected for two years.

EDUCATION. The public school system is under the direction of a state superintendent of public instruction, and the schools in each county are under the supervision of a county superintendent. The schools are very efficient and the percentage of illiteracy is low. The state normal schools are at Peru, Kearney, Chadron and Wayne. The state university and agricultural college is at Lincoln. The University of Nebraska is at the head of the educational system. The higher institutions not under the control of the state are Bellevue College at Bellevue; Cotner University at Lincoln; Doane College at Crete; Fremont Normal College at Fremont; Creighton University at Omaha; Nebraska Wesleyan University at Lincoln; Grand Island College at Grand Island; and Nebraska Normal College at Wayne.

STATE INSTITUTIONS. The hospitals for the insane are at Lincoln, Norfolk and Hastings. The school for the deaf is at Omaha, that for the blind at Nebraska City and the institution for the feeble-minded is at Beatrice. The soldiers and sailors' homes are at Milford and Grand Island, and there is a home for friendless children at Lincoln. The state penitentiary is at Lincoln, there is an industrial school for boys at Kearney, one for girls at Geneva and an industrial home at Milford.

CITIES. The chief cities are Lincoln, the capital; Omaha, South Omaha, Fremont, Grand Island, Nebraska City, Beatrice and Hastings.

HISTORY. Nebraska, named from the Indian "shallow water" (the Platte), was probably visited by Coronado in 1541. It came to the United States by the Louisiana Purchase, and Lewis and Clark explored it in 1804. The first permanent white settler located at Bellevue in 1824. Nebraska City was settled in 1847; Omaha in 1854. After a long struggle, mainly over slavery (See KANSAS-NEBRASKA BILL), Nebraska Territory was organized. It included parts of Dakota, Montana, Wyoming and Colorado. Having been reduced to its present dimensions in 1863, it became a state in 1867. Occasional Indian troubles have been the only interruption to its growing prosperity. Consult Barrett's *History and Government of Nebraska.*

GOVERNORS. David Butler, 1867-1871; W. H. James, 1871-1873; Robert W. Furnas, 1873-1875; Silas Garber, 1875-1879; Albinus Nance, 1879-1883; James W. Dawes, 1883-1887; John M. Thayer, 1887-1891; James E. Boyd, removed; John M. Thayer, 1891-1892; James E. Boyd, 1892-1893; Lorenzo Crounse, 1893-1895; Silas A. Holcombe, 1895-1899; William A. Poynter, 1899-1901; Charles H. Dietrich, 1901; Ezra P. Savage, 1901-1903; John H. Mickey, 1903-1907; George L. Sheldon, 1907-1909; A. C. Shallenberger, 1909-1911; Chester H. Aldrich, 1911-1913; John H. Morehead, 1913—. A few governors have served two terms.

**Nebraska, University of,** at Lincoln (1869). This institution is governed by a board of six regents. It has a fine

site at the state capital, and near Lincoln a farm of 320 acres for its industrial college, which includes the college of agriculture and mechanic arts. It also maintains a graduate school, colleges of literature, science and arts, of law and of medicine, and schools of music and fine arts. The library contains about 100,000 volumes. The total income exceeds $600,000 and there are more than 4600 students. All departments are open to both men and women on equal terms.

**Nebuchadnezzar,** *Neb" u kad nez' ar,* reigning about 605-562 B. C., the restorer of the Babylonian Empire, also noted for his great works of public utility. He secured the Medes as allies and devoted himself to regaining the lost provinces of Babylonia. Wearied at length by the repeated rebellions of the Jews, he destroyed Jerusalem (586 B. C.) and carried the inhabitants to Babylonia. He lavished money upon Babylon to beautify it, and also fortified it by a triple wall. Among his works were the Great Palace, the famous Hanging Gardens, and the quays along the Euphrates and the city walls.

**Nebulæ,** *Neb' u lee,* cloudlike patches of light in the sky. Two such luminous clouds are visible to the naked eye: one, the brightest, in Andromeda; and the other in Orion. Thousands of others are visible through the telescope. Some of the nebulæ are clearly resolved into stars by large telescopes; these are star clusters so far away as to appear merely as clouds of light to the naked eye or through small telescopes. Other nebulæ do not resolve into stars, but by the aid of the spectrum appear to be masses of luminous gas, some lines of the spectrum showing the presence of substances not yet discovered on the earth. The nebulæ have peculiar and various shapes; some of them are probably changing their forms, indicating movement within themselves, and suggesting the possibility that they may be new systems in process of formation. See Stars; Orion; Telescope; Spectrum Analysis.

**Neb'ular Hypoth'esis,** a theory advanced by Laplace, Kant and others to account for the formation of the solar system. The foundation of the theory is the supposition that the bodies comprising the solar system were once a nebulous mass; this mass took a rotary motion on its axis, from east to west; as the temperature diminished and the nebula contracted the rapidity of rotation increased and zones or rings of nebulous matter were separated. Each of these zones contracted into a spherical body forming a planet, which revolves in the orbit that the zone occupied. The planets in turn by rotation separated themselves from rings which became satellites, which in case of Saturn are still seen in the original form of the zone, constituting the rings of that planet.

In proof of the correctness of this theory its advocates claim that the orbits of the planets around the sun and the planes of their rotation upon their axes very nearly coincide; that the direction of revolution around the sun is the same for all planets except Uranus and Neptune; that the satellites of the planets, as a rule, also revolve around their respective planets in the same direction; and still further that the rotation of the planets and satellites on their axes is in this same direction; all of which suggests that millions of years ago the sun, at that time a cloud of gas, was pitched whirling into space, condensing and throwing off portions of itself as it whirled. The nebular hypothesis is not now so generally accepted as formerly. See Astronomy; Laplace, Pierre Simon; Newton, Sir Isaac.

**Neck'er, Jacques** (1732-1804), a French financier and statesman, born in Geneva. In 1747 he entered a Paris banking house as clerk, and in time amassed a large fortune as a banker. In 1777 he became director-general of finances, in which capacity he advocated reforms in the financial policy of the government and endeavored to fund the French debt. This won him many ene-

mies and finally forced his retirement to Switzerland. However, after the ministry of Calonne, the value of Necker's policy was recognized, and in 1788 he was recalled, only to be dismissed the following year. His removal caused an uprising, during which the Bastille was stormed, and though the banished minister was again recalled and accorded an ovation by the populace of Paris, he was not equal to the political or financial exigency, and resigned in 1790. Necker was the father of Madame de Staël. See STAËL-HOLSTEIN, ANNE LOUISE GERMAINE.

**Nectarine,** *Nek' tar in,* a variety of peach tree and, like it, a member of the Rose Family. It resembles the peach tree in form, size, leaves and blossoms but differs from it in bearing a smooth-skinned fruit. This fruit is also called nectarine and is sold upon the market with peaches, pears and plums. The tree grows in all small-fruit regions where the peach can be made to thrive.

**Needle,** a slender instrument of steel, having a point and an eye. It is employed in sewing fabrics, leather and other materials by drawing a thread through them. The most barbaric nations of which we have a history are known to have used some substitute of our steel needle. The American Indian employed awls and needles of bone and of copper to sew his leggings and moccasins. The steel sewing needle was probably first made by hand in Nuremberg, Germany, about 1370, and the industry was introduced into England about 200 years later.

Needles are now made exclusively of refined steel and by machinery requiring a very large number of operations. A fine, even-tempered, steel wire is selected, and this is furnished in coils from which a machine cuts off blanks the length of two needles. These are first straightened, after which they are carried on a moving belt, which rotates them and brings their ends against fast-revolving emery wheels, by which operation both ends are pointed. Another machine is employed to flatten these blanks in their middle and also to punch the eyes in them, after which they are cut apart and strung on wires in order to polish and finish the eyes. At each operation the needles are carefully inspected for defects. They are then sorted, polished, tempered, blued, counted and packed in papers, all by machines nearly automatic in operation. The process of making sewing-machine needles is practically the same, but different machines are used, owing to the position of the eye at the point. Making of the finest needles for hand sewing is confined principally to England and Germany, while the United States makes a very large number of the best sewing-machine needles.

**Negau'nee, Mich.,** a city of Marquette Co., 3 m. e. of Ishpeming and about 12 m. s.w. of Marquette, in the northern part of the Upper Peninsula. The Chicago & North Western, the Duluth, South Shore & Atlantic and other railroads enter the city. The town, located on a ridge called Iron Mountain, is over 1400 ft. above sea level and overlies some of the most valuable iron-ore deposits in the United States. Mining and the shipping of iron ore are the principal industries. Settled in 1870, Negaunee was incorporated in 1873 and chartered in the same year. Population in 1910, 8460.

**Negligence,** *Neg' li jens,* in law, the failure to do something which a reasonable person, guided by those considerations which ordinarily regulate the conduct of human affairs would do, or doing something which such a prudent and reasonable person would not do. The law recognizes three degrees of negligence: (1) *gross negligence,* representing a want of care amounting to recklessness; (2), *ordinary negligence,* the absence of such care as would be ordinarily exercised by a prudent person; and (3), *slight negligence,* standing for the lack of care which is required of one who is doing a favor to the injured party. In case of suit for damages arising from negligence, the burden of proof rests with the plaintiff, and the

fact of negligence is decided by the jury. In case the party claiming damages contributes by his negligence to the injury, he cannot recover damages.

**Negotiable,** *Ne go' shi a b'l,* **Paper,** a written instrument or contract which is transferable by indorsement or delivery, and which is treated as a security for and representative of money. Not all *assignable* instruments are *negotiable.* Bills of lading, warehouse receipts and like documents are assignable, but represent goods, not money; and their transference can carry only such title as is involved in the possession of the goods themselves. If such documents are stolen, for instance, the goods can be recovered by the rightful owner. The case is otherwise with negotiable paper, which represents money. When it is transferred, absolute title goes with it. The most common forms of negotiable paper are bills of exchange, promissory notes and bank checks (See BILL OF EXCHANGE; PROMISSORY NOTE; CHECK; DRAFT). There are also other forms, such as corporation and municipal bonds, exchequer bills and script for government bonds.

VALIDITY. No fixed form of words is necessary in writing negotiable paper, but it is usually made payable *to the order* or *to bearer.* If a note is made payable to a specified person and not to his order, it is not negotiable in form. The promise or order to pay must also be unconditioned, so that its clearness may not be in doubt. It must be a promise to pay money, not goods, and a definite amount. The time of payment must be specifically fixed. A note must also be delivered in order to be valid; if made out and locked in a desk, it still belongs to the maker. A note is not valid unless the parties thereto are legally competent. A minor, for instance, cannot give a note that is binding.

HOW TRANSFERRED. Negotiable paper is transferred by *delivery* or by *indorsement.* If it is payable to the bearer, it may be passed freely by simple delivery from one party to another, and it belongs to the party who holds it at any given time. If it is made payable to the order of some party, however, it must be indorsed by that party before it is transferable. This is done by writing the name across the back of the document. The indorsement may either be *in blank,* by writing the name alone, in which case the paper then becomes payable to bearer; or, the person indorsing the paper may make it payable to some other party or his order, in which case this party must indorse it in turn, either in blank or to still another party, and so on. All of the indorsers are legally responsible for the payment of the paper, unless they indorse it "without recourse" or in some other qualified way. A paper may also be indorsed by an outside party as security, in which case he becomes legally liable for its payment.

PROTEST. If indorsed paper is not paid when due, it may be protested. This is a solemn declaration made in writing by a notary public, or by creditable witnesses, to the effect that when the paper was due it was presented to the parties liable for its payment, and that payment was not made. The object of the protest is to have proof that the parties to the instrument were duly notified and payment demanded of them.

**Ne'gro,** a dark-skinned race of men living in Africa. In a wider sense the term includes all the dark races of the subtropical and intertropical regions of the Eastern Hemisphere, but the Bantu group, Hottentots, Bushmen and Congo dwarfs are classed as negroids, and are thus distinguished from the pure negro type. The physical characteristics common to the negro are, the brown or black complexion, dark, woolly hair, broad, flat nose, thick lips and long skull.

The true negroes live in the Sudan. To the south of them are found the Bantu group, the Hottentots, the Bushmen and the Congo dwarfs. A great number of negroes live in the United

States and other parts of the civilized world, where their ancestors were brought from time to time in a state of slavery. See NEGRO, EDUCATION OF THE.

**Negro, Education of the.** Outside of the United States, the education of the negro has usually been of comparatively little concern to the white man. Where there were few negroes, their education constituted no special problem. During the period of slavery the negro gained much which formed the foundation of his advancement after emancipation. While, previous to their freedom, only a small number of the colored people learned to read and write, all learned the language of a civilized people and all acquired habits of industry, while a goodly number became skilled in such trades as carpentry and blacksmithing. Moreover, during the war, while their masters were in the army the management of the estates was left largely to the slaves, and through the responsibility thus thrust upon them they gained some knowledge of administrative affairs.

As the war progressed, the people in the North became interested in the education of the negroes. The missionary societies and churches were first in the field. In 1861 the American Missionary Society opened a school at Hampton, Va., which has since attained more than a national reputation (See HAMPTON NORMAL AND AGRICULTURAL INSTITUTE). The churches began to establish schools throughout the South, and by 1865 institutions supported by the various religious denominations were formed in all the states from Virginia to Texas. In 1865 the Freedman's Bureau was established by the government, and by 1870 it had expended more than $5,000,000 in providing schools and instruction for negroes.

At first the teachers were white men and women from the North, but as the movement progressed provision was made for educating and training negro teachers, and by 1878 over 25 normal schools and colleges were engaged in this work. Most of these institutions have continued to the present time and they have trained thousands of teachers for negro schools. When these schools were established, practically no attention had been given to industrial education in the United States, and it was natural that the founders of these schools should introduce into them the same courses of study that were found in similar schools in the North; hence many of the branches were impractical and wholly unsuited to the conditions which the students must face when they left school. The change to more practical courses was due to Gen. Samuel C. Armstrong, the founder and first president of Hampton Institute (See ARMSTRONG, SAMUEL CHAPMAN). It was in this institution that Booker T. Washington obtained his education and the inspiration which led him, in 1881, to establish the Tuskegee Normal and Industrial Institute. Through the work and influence of these two institutions, industrial education has been widely spread among the negroes of America.

Previous to 1870 there were no public schools for negroes, except in a few of the larger cities. The resources and property of the South had been destroyed by the war, and there were no funds for educational or other public purposes. As the states began to recover, however, public school systems, providing separate schools for white and colored children, were established. In every state the number of these schools has been increased and their standard raised with the increase of the public school fund. High schools and agricultural schools for colored youth are now maintained, making the educational advantages of the negroes equal to those of the whites. In their educational work the Southern States have been very materially assisted by the Peabody Education Fund, the John Slater Fund and the General Education Board. See SLATER FUND; PEABODY EDUCATION FUND; GENERAL EDUCATION BOARD; TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE; WASHINGTON, BOOKER TALIAFERRO.

**Ne"hemi'ah,** a book of the Old Testament, following *Ezra* and preceding *Esther;* also the name of the author of the book. Originally the book of Nehemiah was united with the book of *Ezra.* Nehemiah was a pious Jew who was made cupbearer to King Artaxerxes of Persia. In 445 B. C. he was sent as governor to Jerusalem, being commissioned to rebuild the walls and gates of the city. This task he accomplished in spite of many difficulties, besides inspiring the hearts of the people with the spirit of piety and enthusiasm. He revisited Jerusalem in 433 for the purpose of abolishing certain abuses that had crept in during his absence. The period covered by the book of *Nehemiah,* which chronicles these events, is of 13 years' duration, from 445 B. C. to 432 B. C. See BIBLE, subhead *The Old Testament.*

**Nelson,** a city of Canada in the Province of British Columbia, on the west arm of Kootenay Lake, on the Canadian Pacific and Spokane Northern railways, 82 m. s. of Revelstoke. There is steamer connection with Kootenay Landing, Kaslo and points up the Kootenay River. The city is surrounded by a fruit-growing district, has an important wholesale business and is the judicial center of Kootenay. Among the important buildings are hotels, schools and banks. The city contains cigar, box, sash and door factories, cement-block and brick plants, a smelter, a foundry, a machine shop, flour and saw mills, a tannery and a fruit-packing house. Population in 1911, 4476.

**Nelson, Horatio,** VISCOUNT (1758-1805), a celebrated British naval commander, born at Burnham-Thorpe, in Norfolk, England. He was practically deprived of schooling and entered the navy at the age of 12, where he came under the care of his uncle, who was captain of the ship. To this uncle, Nelson owed much for his thorough training in seamanship and for his rapid promotion. During his early service he made voyages to the East Indies and to the Arctic regions. Nelson was never physically strong, and he suffered much from ill health. At the age of 21 he became captain, but after that his promotion was slow because of the rule that promotion above captain must be according to seniority. In 1783 he was appointed to the command of the *Boreas* and served for the next four years in the West Indies, where he incurred the displeasure of his superior officer and certain vested interests because of his strict enforcement of the navigation laws. His acts, however, were finally approved by the British Government. In 1787 he was relieved from active service.

The war with France caused all officers of the British navy to be called into active service, and in 1793 Nelson was placed in command of the *Agamemnon,* a 64-gun ship and one of the best in the navy. His ship was assigned to the Mediterranean fleet. While in the Mediterranean, Nelson was sent on several diplomatic missions, and he took an active part in the conquest of Corsica, where he lost his right eye. In 1796 he was promoted to the rank of commodore. The success of Napoleon and his alliance with Spain rendered the position of the British fleet in the Mediterranean precarious, and the government decided to withdraw. In the movements that followed, Nelson performed distinguished service in securing to Great Britain all her property and avoiding collision with the Spanish fleet. He then rejoined Admiral Jervis and took a leading part in the battle with the Spanish fleet, Feb. 14, 1797, where by his skill and bravery he did much to win the victory. The Spanish fleet of 27 ships was totally destroyed, though the British fleet numbered but 15 ships. In July of the same year he made an attack on Santa Cruz or the Island of Teneriffe, but was repulsed and lost his right arm. On his return to England he was invested with the Order of the Bath and given a pension of £1000 a year.

In 1798 Nelson joined the Earl of St. Vincent and soon became recognized as

the ablest officer in the British navy. Napoleon's victories had placed England in a position standing alone against Europe. Should she meet with reverses on the sea her power would be practically lost. Napoleon sent his expedition to Egypt for the express purpose of injuring England. Nelson was ordered to follow. He found the French fleet and practically destroyed it, Aug. 1, 1798, in the Battle of the Nile. This compelled the French to return. For this victory Nelson was created Baron Nelson of the Nile. In 1801 he was promoted to be vice-admiral and on April 2 destroyed the Danish fleet in the harbor of Copenhagen and compelled the Danes to sign an armistice very favorable to England. In 1803 he was made commander-in-chief of the Mediterranean fleet, and for the next two years blockaded Toulon, but the French fleet escaped, and after a prolonged chase he blockaded the fleet at Cadiz. This was the occasion of the Battle of Trafalgar, which occurred Oct. 19, 1805. Before beginning the engagement Nelson gave his celebrated signal, "England expects every man to do his duty." The combined French and Spanish fleets were totally destroyed, but Nelson was mortally wounded and died two days later. He was buried in St. Paul's, London, with distinguished ceremonies. See TRAFALGAR.

**Nelson, Wolfred** (1846- ), a celebrated physician, born in Montreal and educated at McGill and Lennoxville universities. He was a member of the College of Physicians and Surgeons, Province of Quebec, later successively practiced in Montreal, settled at Panama, where he served on the state board of health, spent four years collecting data on climatology and tropical disease throughout Mexico, Central and South America, the West Indies and Europe, and finally, in 1890, went to New York. Dr. Nelson, who has written extensively on travel and medical subjects, was for 15 years a regular correspondent of the *Gazette*, published in Montreal.

**Nelson River,** a river situated in Manitoba, Canada, rising in Lake Winnipeg. It flows northeast from the north end of the lake through a series of smaller lakes, emptying into Hudson Bay at York Factory. It is about 400 m. long. The mouth of the river is 710 ft. lower than its source, resulting in numerous cascades and rapids and rendering navigation difficult in its upper course, but it is navigable 125 m. from its mouth. The Nelson and the Saskatchewan form one of the four great river systems of the Western Divide, covering a distance of 1450 m. and draining a region of 360,000 sq. m. in area.

**Nelum'bo.** See LO'TUS.

**Nem'esis,** in classic mythology, an avenging goddess who meted out just punishment from the gods, especially to the haughty. By some authorities she is considered the daughter of Erebus and Night and by others the daughter of Zeus and Necessity. She is represented in art as a woman of queenly bearing, wrapped in a tunic. She was worshiped by the Greeks and Romans.

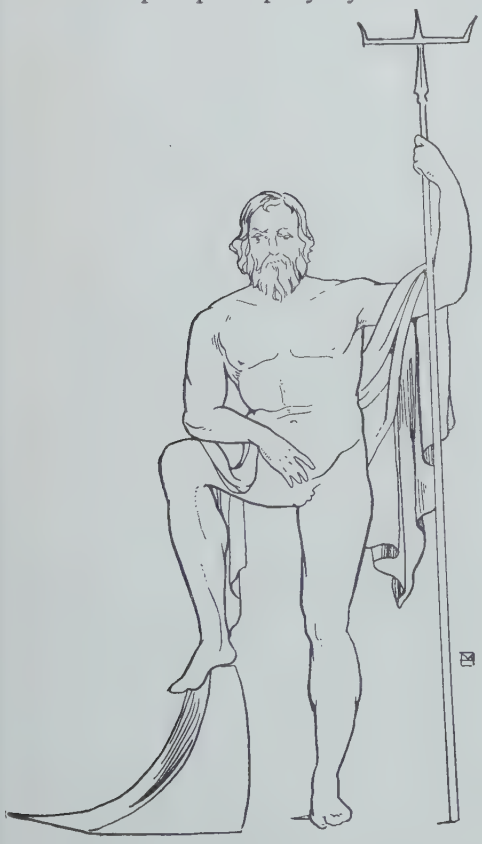
**Nepal'.** See INDIA.

**Nep'otism,** favoritism used by officials having appointing power to place their relatives in positions which pay good salaries. The practice, whether in government or business, is severely condemned because it tends to lower the standard of efficiency and encourages corrupt practices. The term comes from the Latin word *nepos,* meaning nephew.

**Nep'tune,** the outermost planet of the solar system, and eighth from the sun. Its distance is more than 2,500,000,000 m. from the sun. Its diameter is about 35,000 m., or more than four and one-half times the diameter of the earth; its day is unknown; its year about 165 of our years. Neptune is not visible to the naked eye, and is difficult to locate with the telescope. Its discovery in 1846 was the result of careful calculation on the part of astronomers who sought it to account for certain irregularities in the movements of Uranus. Neptune has one moon. On account of the distance, so far beyond the power of human com-

prehension, very little is yet known about this far wanderer through the stellar spaces, except that it shines with a pale blue light. See SOLAR SYSTEM.

**Neptune** (in Greek, Poseidon), in classical mythology, god of the sea, son of Saturn and Rhea, and brother of Pluto and of Jupiter, to whom alone he was second in authority. Neptune aided in building the walls of Troy, and when King Laomedon denied him the promised reward, he punished the people with a huge sea monster, which yearly demanded a beautiful maiden. It was finally killed by Hercules. The god of the sea was worshiped principally by the mari-



NEPTUNE

time Ionians, who sacrificed rams, boars and black bulls to him. He was usually represented as accompanied by a dolphin and as carrying a triple-pronged scepter. From his palace in the deep sea, he would drive out over the waves in a chariot drawn by brazen-hoofed and golden-maned horses. At his coming the waters were stilled.

NEREIDS

**Nereids,** *Ne′ re ids,* sea nymphs, daughters of Nereus and Doris, in attendance on Neptune. According to various accounts they are 50 or 100 in number, human in appearance, or with green hair and the tails of fishes. They are often represented riding on sea monsters. See NYMPHS.

**Ne′ro** (37-68), a Roman emperor, son of Agrippina, the wife of the Emperor Claudius. His mother succeeded in poisoning Claudius and in placing her son Nero on the throne (54). He had a love for art and literature, and had acquired a taste for philosophy under his tutor, Seneca. During the early years of his reign he was under the influence of his mother, a capable but unscrupulous woman, and of Seneca and the faithful Burrus, prefect of the prætorian guard. For a time he ruled well. Then he freed himself from his mother's influence and gave himself up to a life of excesses. Nero's cruel deeds were equaled only by his silly vanity, and he posed as a poet and singer. He was accused of setting fire to Rome; and was also reported to have enjoyed the spectacle of the burning city from the roof of his palace. When public feeling ran high against him, he turned the popular fury by accusing the Christians of the deed, whom he cruelly

persecuted. He began the rebuilding of the city, and at about this time erected the great palace on the Palatine Hill which was called the Golden House. Two conspiracies against him failed, but at length the legions in the provinces revolted, the Senate at once proclaimed him an enemy, and he committed suicide to escape falling into the hands of his foes.

**Nervous,** *Nur' vus,* **System,** the nervous mechanism of the animal body consisting of the nerve centers and the nerves connected with them. Some animals, such as the starfish, possess very simple nervous systems, consisting of a central nerve ring with fibers extending outward. In man the nervous system is exceedingly complex, and consists of the cerebrospinal and sympathetic systems. The cerebrospinal system includes the brain and spinal cord, and the cranial and spinal nerves (See Brain; Spinal Cord).

The distinguishing property of the nervous tissue is its conductivity, or power to transmit messages in a way similar to that by which they are transmitted over the telephone wires. The cerebrospinal, or central, system may be likened to the telephone exchange, and the connecting nerves to the incoming and outgoing wires over which the messages pass. There is one very great difference, however, between the human mechanism and that of the telephone. In the former, incoming messages pass over one set of nerves, and outgoing messages over another set; and under no circumstances can their functions be made to operate interchangeably. The nerves over which the incoming, or afferent, impulses pass are sensory. They transmit sensory impressions from the sensory end organs of touch, hearing, vision, smell and taste to the nerve centers. Those nerves over which the outgoing, or efferent, impulses are carried are motor. They terminate in the muscles and give rise to muscular movement. Now, the function of the great nerve centers is the conversion of incoming nerve impulses into outgoing nerve impulses, causing an appropriate movement. Raising an umbrella in a shower is a good illustration of changing incoming nerve impulses to proper outgoing impulses. We see the rain, or hear or feel it; that is, the information that it is raining is conveyed to the brain over the nerves of touch, sight or hearing, or over them all. These impulses stimulate to action the motor centers controlling the movements of the arms, and the umbrella is raised. Such an act is complex, involving both the sensory and motor nerves, the brain centers, in which these nerves originate, the transmission of the impulses received through the centers of the sensory nerves to the proper centers of the motor nerves, and the discharge of impulses from these centers to the motor nerves of the arms. Raising the umbrella is a purposeful act; therefore it is directed by the will. A much simpler process is found in reflex action, by which a sensory impulse is directly translated into muscular impulse without the interference of consciousness. If a barefoot boy steps on a tack, the foot is instantly withdrawn before he is conscious of what has happened. The sudden act of withdrawal, then, is obviously the result of some process not connected with the brain, which we have called the seat of consciousness. In such an act the sensory impulse is simply turned back along a motor pathway by a nerve cell in the spinal cord (See Reflex Action).

The brain and spinal cord contain millions of these nerve cells, which constitute a mass of gray matter whose structure has been described in the article on the brain and spinal cord. It has been estimated that the number of nerve cells of the human nervous system is three thousand million. From each cell fine fibers branch out and interlace with the fibers of other cells and transmit impulses to one another, or pass out of the spinal column and extend to various parts of the body. Outside the spinal column all nerve cells are called peripheral nerves. Twelve of these peripheral nerves arise from the under surface of the brain and are distributed over the head and to the upper part of the trunk. These are called cranial nerves

(See CRANIAL NERVES). Branching from the spinal cord are other peripheral fibers called spinal nerves. There are 31 pairs of these spinal nerves. Their fibers arise in the cells of the gray matter in the spinal column and, penetrating the white fibers enclosing this gray cell substance, pass out through openings between the vertebræ. Those passing from the anterior part of the cord are motor nerves; those from the posterior side are sensory. Outside the cord the sensory nerves form a ganglion, or enlargement, caused by an aggregation of cells, and then unite, each with its adjacent motor nerve, to form a nerve trunk. The trunks proceed a short distance and then begin to branch and interweave, forming what is called a plexus; the trunks of the right side of the body send branches upward and downward, which unite with the branches from the trunks above and below, and finally are distributed to the skin, a motor nerve branching wherever a sensory fiber branches and accompanying it as persistently as the bark accompanies the twig. Those of the left side ramify in the same manner.

THE SYMPATHETIC NERVOUS SYSTEM. This branch of the nervous system is made up of ganglia which extend from the head to the pelvis, passing through the neck, thorax and abdomen. These nerves resemble those of the cerebrospinal system in appearance and structure, but they are less sensitive and act more slowly than the latter, and they control the functions of digestion, secretion and excretion and circulation. The ganglia lie in pairs on each side of the spinal column, and all unite to form a single ganglion in the pelvis. In the head the sympathetic nerve fibers extend to the palate and mouth glands and to the muscles of the eye. The ganglia of the thoracic cavity are connected by a sympathetic fiber and communicate with the cerebrospinal nerves. The chief abdominal ganglia are the largest in the body. Their branches unite to form the solar plexus, which is situated behind the stomach. From this ganglion nerves pass to other abdominal plexuses and to the abdominal blood vessels. Like the thoracic ganglia, those of the abdominal region are connected by a sympathetic cord and are connected with the cerebrospinal system by spinal nerves.

**Nes'tor,** a Greek hero, son of King Neleus of Pylos, distinguished for his wisdom and eloquence. He aided the Lapithæ against the Centaurs, hunted the Calydonian boar, sailed in the Argo, and, at an advanced age, conducted forces in 20 ships against Troy.

**Nesto'rians,** a religious sect of Eastern Christians, whose name is derived from Nestorius, Bishop of Constantinople, 428-431. In 431 Nestorius was condemned by the Council of Ephesus for preaching the doctrine of the dual personality of Christ, and some years later was banished to Egypt. His followers, driven into Persia, gained control there of ecclesiastical affairs, in the fifth century establishing the Nestorian Church as a separate organization. They reached the height of their power in the 13th century, but from this time on their prosperity lessened. Not only was their number decreased by the persecutions of the Tartars, but internal dissensions also weakened the Church. Some of the Nestorians joined the Roman Catholic Church; in 1898 the Persian branch, about 30,000 persons, joined the Orthodox Church of Russia; the remnant today number less than 100,000.

**Nests of Birds.** The nests of birds are designed for the protection of the eggs and also of the young until they are able to care for themselves. The nests are of many degrees of complexity and are usually hidden so as to be concealed from possible enemies; rarely, they are placed in conspicuous places. A few birds make no nests and lay their eggs on the bare rocks or ground; such are the auks and other sea birds, which nest in large colonies on the cliffs, and the nighthawk. Many birds, as the loon, construct just enough of a nest to keep the eggs from rolling about. The whippoorwill gathers a few leaves to form a depression in which the eggs are laid. The grebes build a bulky nest of water plants

in marshy places, and cover the eggs with vegetation when leaving the nest or when danger is near.

The tunnelers, like the bank swallow and the kingfisher, dig tunnels in sand banks to the depth of from 3 to 10 ft., and make a small chamber at the end, which may or may not be lined with feathers; the burrowing owl usually makes use of a discarded prairie dog's burrow. In Australia and parts of Asia certain birds, called brush turkeys, build large mounds of sand, leaves, etc., often 15 ft. high and 60 ft. in circumference, in which the eggs are buried until the heat, generated by the accumulated material, hatches them. The majority of ducks, geese, gulls and terns and the wading birds build their nests on the ground, using seaweed, rushes and other water plants, and lining their structures with down and feathers.

Some birds are known as the masons because they build a nest of kneaded clay; the retort-shaped nests of the cliff swallows, which are placed on the face of a cliff, and the mud nest of the barn swallow are of this class. Others nest in the holes in trees, lining the nest with feathers or other material. If, like the woodpecker, they dig the hole themselves they are called carpenters.

Among the tree nesters are also the platform builders, like the mourning dove, that build rude platforms of sticks; and the basket makers, like the catbird and the brown thrasher, that make large, open nests resembling baskets. A species of thrush living in South Africa constructs a series of nests in a single mass with a roof of twigs overhead and a woven gallery leading to each nest. Among the woven nests are the hanging structures of the orioles and the vireos, made of the finest grasses and lined with softest down. The nest of the social weaver bird excels all others in size, for it is the nest of a colony and resembles a huge umbrella with the individual nests situated along the edges of the platform. The tailor bird sews together two parts of a leaf to make a receptacle for its beautifully-woven nest. Other nests are circular or dome-shaped with the opening at the center of the side; such are the home of the marsh wren, which is attached to reeds in swampy places and is woven of sedges and lined with plant down, and the simpler arched nests of the ovenbird and the meadow lark.

The highest art of nest building is found among such birds as the American goldfinch and the humming bird, which build compact nests of felt made from animal or vegetable wool strongly matted together. The outside framework is made of fine grass or rootlets and the nest is firmly bound in the crotch of a tree. The chimney swift secretes a sticky saliva, with which it cements a few sticks together and fastens them to the inside of a chimney. A sea swift of China makes its nests entirely of a sticky mucus and places them on the sides of rocky caves; these are the edible birds' nests eaten by the Chinese. Consult Rennie, *The Architecture of Birds;* Wood, *Homes Without Hands;* Dugmore, *Bird Homes.*

**Net,** a fabric of twine, cord or like material used in capturing fish, insects or even Mammals. The wide use of the net in the taking of fish has led to the invention of numerous varieties adapted to different purposes or for the taking of different fish. There are three chief varieties: the trawl, the gill net and the seine. The trawl is a large bag net for deep-water fishing. Its mouth is held open by beams, and it is dragged along the sea floor. This form of net is frequently called the beam trawl or purse net. Gill nets are those whose meshes are of sufficient size to admit the head of the fish, but whose strands catch in the gills when the fish endeavor to extricate themselves. These are used in any depth of water sufficient to float them and are generally placed across channels through which fish commonly pass. Because of their position they are sometimes known as drift nets. The seine is a long net having sinkers on one edge and floats upon the other. It generally hangs vertically in the water, but may be somewhat baglike. It is designed to be drawn in at the ends and so brought to shore.

Pound nets, of common use in the Great Lakes, are the modern form of the ancient weir. They are set much like a fence supported by stakes, and are terminated by a labyrinth of net. A less well-known variety is the type net, which is somewhat cylindrical in form. It is set at the bottom and has several compartments, entrance to which is by means of funnels that allow the fish to swim into the net but not out of it. Such nets are generally set at night and lifted the next morning. Change in nets since earliest times has been very slight, the greatest improvements being in the machinery for raising or lowering them. After use, the nets are generally cleaned and spread upon frames to dry so that the cords will not decay.

**Neth'erlands,** or **Hol'land,** a constitutional monarchy of western Europe, forming with Belgium the lowest part of the Continent. It lies between 50° 45′ and 53° 30′ north latitude and 3° 25′ and 7° 12′ east longitude, and is bounded on the e. by Prussia, on the s. by Belgium and on the w. and n. by the North Sea. Its area, 12,741 sq. m., exceeds that of Maryland, and it represents one of the smallest independent states of Europe.

Surface and Rivers. The surface of the country has in large part shaped its history. No point is more than 120 m. distant from the sea, and small areas are from 16 to 20 ft. below sea level, while almost the whole territory is too low for natural drainage. Along the northern boundary is the Zuyder Zee, once in part an ancient lake. Along the coast are numerous islands, including the Frisian group, comprising Texel, Vlieland, Ameland and others. Dunes, dikes and polders (enclosed swampy pieces of land for reclaiming purposes) guard the country against the sea. The dunes have been formed naturally by the wind and sea, and long ridges of sand from 35 to 200 ft. high and from 20 to 60 ft. apart have been heaped up from the ocean. The dikes are earthen and are protected by stone-slopes and piles. Whatever land is reclaimed possesses a high degree of fertility, after the peat has been cut away and the moss and heather removed from bog or moor. Attempts are now being made to recover the Zuyder Zee. The highlands are chiefly sand hills, and the highest elevation, 1050 ft., is in the extreme southeast. The important rivers of Netherlands are the Rhine, the Meuse and the Schelde, and they are all international streams of commercial significance. The arms of the Rhine include the Waal, the Lek and the Yssel. Numerous lakes exist, and among those which have been drained are the large Haarlem Lake, whose bed has now yielded 72 sq. m. of arable land.

Climate. The climate is moist, and there is not a wide range of temperature in winter and in summer. Bright weather at extended intervals is rare, and the damp and misty days breed marsh fevers and similar diseases, though on the whole the country is said to enjoy a healthful climate.

Fisheries, Mining and Agriculture. The fishing industry consists of river and coast and deep-sea fishing, and is highly important. The chief branches are the herring, oyster and sprat fisheries, and the value of the catch is estimated at over $3,000,000 annually. The mineral supply is small. Peat, or turf, is cut in large quantities, and a fairly large amount of coal is mined, while from the Rhine, clays, bricks and tile are produced to supply the deficiency of building stone.

Only about three-tenths of the surface is cultivated land, but along the rivers in the south and in the northern and western provinces agriculture has reached a high state of development. The chief products are wheat, rye, buckwheat, hops, sugar beets, tobacco, potatoes and flax, and the yield is comparatively large, due to careful and efficient methods of tillage. The country ranks sixth in the production of beet sugar. Vegetables are grown in large quantities, and the cultivation of flowers is practically unsurpassed in Europe, the bulbs and seeds, particularly of Haarlem, being known all over the world. The moist climate is favorable for pasture growth,

and the breeding of cattle, horses, sheep and poultry is given careful attention. In proportion to its area Netherlands is the foremost dairy country of Europe, and the products, which are extensively exported, are celebrated for their high degree of excellence. Eggs and honey are also exported.

Manufactures, Commerce and Transportation. Manufacturing is not so extensive as in some other countries, due to a deficit of coal and iron, and very few articles are exported. Ships, machinery, hardware, railroad material, tin plate, gold and silver ware and textiles are manufactured. Linen, calicoes, sail cloth and woolens are extensively produced, but the Dutch woolens have gradually been equaled by those of Germany, England and France. The diamond industry of Amsterdam is wholly in the hands of the Jews, and has not lost its importance despite the competitive trade of Paris, Antwerp and London. The Dutch trade is preeminently maritime and includes every continent. The greatest profit results from the carrying and forwarding trade, and one of the chief branches of the commercial activity is the importation and reexportation of Dutch colonial products throughout the world. Rotterdam and Amsterdam have become the centers of trade as a result of the great ship canals that have been constructed. The North Sea Canal, built between Amsterdam and the North Sea, is 16 m. long and is large enough to meet all the requirements of the modern shipping trade. The whole country is a net of these waterways, even the small villages being connected with one another by means of canals. International commerce is carried on chiefly by the railroads, for they transport most of the materials that England sends into the heart of the Continent. The State owns about one-half the railroad mileage. Good wagon roads, paved with brick, are found throughout the country and measure approximately 3000 m. in length.

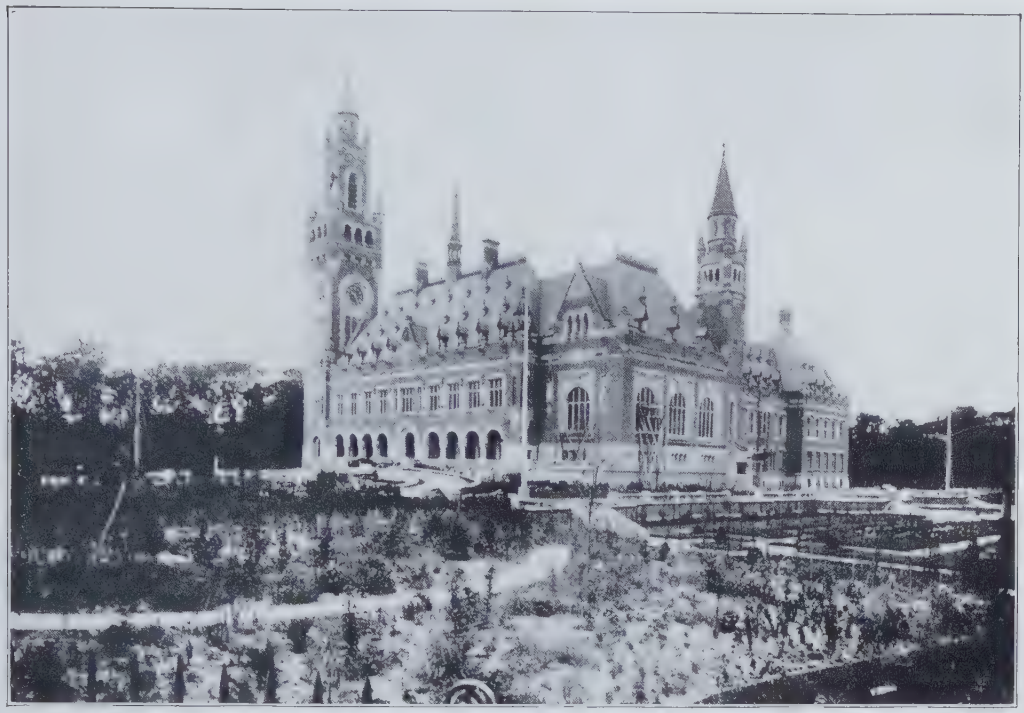
Inhabitants. The population of Netherlands consists chiefly of peoples of Celtic and Teutonic stock. The Celts were gradually conquered, and the Batavians, of Teutonic stock, comprise about 70 per cent of the population. They dwell in Zeeland, Gelderland, Utrecht and the provinces of North and South Holland. Other groups are the Frisians of Drenthe, Friesland, Groningen and Overyssel, and the Flemings of Limburg and North Brabant.

Government and Religion. Netherlands is an hereditary monarchy according to the constitution of 1815, later revised. The two chambers of the Parliament have unequal powers. The Upper Chamber, comprising 50 members, is elected by the provincial legislatures of the kingdom. They serve for nine years, and are chosen from among the highest taxpayers and from high officials. The Lower Chamber consists of 100 members, elected by direct suffrage and by districts. Those qualified to vote for the members of this chamber are male citizens over 25 years of age who own or dwell in houses or boats or who show marked business ability or are generally capable. Both chambers ordinarily meet once a year, but sessions in extraordinary may be summoned by the Crown at any time. The sovereign is, in rights, inviolable and irresponsible, and exercises his executive powers through ministers presiding over the eight departments: foreign affairs, interior, finance, justice, colonies, marine, war and public works and commerce.

There is complete religious freedom, and numerous sects and creeds exist. The Protestants belong chiefly to the Dutch Reformed Church. The Roman Catholics rank next in numbers and live south of the Rhine. The Jews live in North and South Holland; there are about 9000 Jansenists.

Chief Cities. The principal cities are The Hague, the capital; Rotterdam, Amsterdam, Utrecht, Haarlem, Groningen, Leyden and Arnhem.

History. The present kingdoms of Holland and Belgium were originally included in the Low Countries, or Netherlands. The early inhabitants were con-



THE TEMPLE OF PEACE, THE HAGUE

The gift of Andrew Carnegie, for the use of the Permanent Court of Arbitration.

## A HOME OF ROYALTY

THE KING'S PALACE, AMSTERDAM

This, the city's handsomest secular building, was presented to King Louis Napoleon in 1808.

quered by the Romans in the first century A. D. The Franks conquered the southern part in the fifth century, and by the eighth century the whole region was under Frankish rule. By the Treaty of Verdun (843) it was divided into three parts, and the inhabitants gradually developed into two distinct peoples; the northern became German in manners and customs, while the southern adopted the language and characteristics of the French. When Charles the Bold of Burgundy died in 1477, the rich Flemish towns which had sprung up were rewarded for their fidelity to his daughter, Mary, by a grant of *The Great Privilege,* which promised that legislative meetings could be held at will, that the people should assess their own taxes and decide questions of war. By her marriage with the Emperor Maximilian, Mary caused the country to become a possession of the House of Hapsburg.

Charles V received Netherlands as a part of his vast inheritance, and tried to suppress the growth of Protestantism. His son, Philip II of Spain, with the best soldiers of Europe and enormous resources, was animated with such religious zeal that he was willing to sacrifice the country in order to extirpate the new faith. At last the provinces rebelled because of the severe persecutions, and in 1579 the seven northern states drew together in a permanent confederation, known as the Seven United Provinces of the Netherlands, with the Prince of Orange as stadtholder (See WILLIAM OF ORANGE). This was the virtual founding of the renowned Dutch Republic. The seven provinces declared their independence in 1581. The ten Catholic provinces in the south ultimately returned to their Spanish allegiance (See BELGIUM, subhead *History*).

Philip II died in 1598, but the war was continued by his successor, Philip III, and so stubborn was the resistance of the Dutch that the King of Spain entered into the celebrated Truce of 1609, a virtual acknowledgment of the independence of the provinces. In the Peace of Westphalia (1648), their independence was formally recognized. In the 17th century Netherlands became a foremost commercial and maritime power, and by 1640 Dutch vessels were carrying the greater part of the world's commerce. The power of Louis XIV on the Rhine, the Navigation Acts and the open-war policy of England led to the commercial decline of the country. It was overrun by French armies during the French Revolution, and Belgium was annexed to France, while Holland was conquered and called the Batavian Republic. During the Napoleonic wars the country was annexed to the French Empire.

By the Congress of Vienna (1814-15), Holland became the Kingdom of Netherlands, with the House of Orange restored as rulers, and Belgium, in spite of its protests, was added to it. In 1830 Belgium formed an independent kingdom. Since then there have been no violent changes, and advancement has been made in constitutional government. The Hague has become the seat of the Permanent Court of International Arbitration. Population of Netherlands in 1910, 5,945,155.

**Net'tle,** a name given to a number of species of the Nettle Family, most of which produce a coarse fiber used in making ropes. They are all herbs, with a watery juice and stems covered with many stinging hairs. The leaves are rough, almost stemless, and have rounding scallops on their margins. The hemp nettle, common everywhere, has been naturalized from Europe and is used in the production of fiber. In Dresden a fine thread, and in China grass cloth are made from the fibers of a nettle.

**Neuchâtel,** *Nu" sha" tel',* **Lake of,** a lake in the western part of Switzerland, 19 m. n. of the Lake of Geneva. It is the third in size among Swiss lakes, having a length of 24 m. and a width varying from 2 to 5 m. The shores are generally low and marshy, and the hillsides are covered with vineyards and forests. As a whole, it lacks the beauty and picturesqueness of so many other Swiss lakes.

**Neuralgia,** *Nu ral' ji a,* a term used to denote a condition of the nerves, which gives severe pain in one or more distinct nerves. It is caused by injuries to or inflammation in the nerve, by irritation produced by disturbances in adjacent parts, and usually affects thin-blooded persons of weak nerves, who have been suffering from overwork, general depression or loss of vitality. When the malady occurs in the head, it is called tic douloureux; when in the chest, intercostal; in the breast it is angina pectoris. Neuralgia is frequently brought on by exposure to cold or dampness, overindulgence in alcoholic beverages or by a wound. It often occurs in the course of typhus or intermittent fevers.

**Neurasthenia,** *Nu" ras the' ni a,* a disease of the nervous system resulting from long-continued strain. While the greatest number of cases result from overwork, other causes are intemperate use of alcohol and tobacco and vicious habits. The symptoms of the disease are numerous; irritability, nervousness, insomnia and indigestion are conspicuous among them. It aggravates organic diseases, and is itself rendered more acute by such diseases and more resistant to treatment. Rest and outdoor exercise, freedom from worry and responsibility constitute the best remedial agencies. In the United States neurasthenia is very common, and attacks men and women impartially.

**Neuritis,** *Nu ri' tis,* inflammation of one or more bundles of nerve fibers. Two varieties have been recognized, the localized and the multiple. In localized neuritis a single nerve may be affected as a result of exposure to cold, blows or wounds, or any other injury to the nerve. The first symptom of this form of neuritis is a penetrating pain along the course of the nerve and its branches, and sensitiveness of the affected parts to pressure. Movement of connecting muscles also becomes painful. Multiple neuritis is that form of the disease which may affect many of the nerve endings near the outer surface. It may result from a variety of causes, such as poisoning by lead, mercury, copper or phosphorus, general disorders, local action of certain diseases or the immoderate use of alcohol. The last cause is the most common.

**Neuroptera,** *Nu rop' ter a,* a group of Insecta in which are classed the ant lions and lace-winged flies. The members of the class are distinguished by their many-veined wings. The larva, or the insect in the second stage of its development, is active and carnivorous, and in its adult stage may be known by the jointed appendages about its mouth. See Insecta; Ant Lion.

**Neutral'ity,** a term applied in international law to the status of a state which maintains an attitude of noninterference in respect to existing war between other states, rendering neither aid nor service to either belligerent in military operations. The doctrine of neutrality constitutes a large part of the existing body of international law, but in medieval times it was of little importance. The first recognition of neutral rights was embodied in a maritime code which declared that the goods of a neutral were exempt from capture, although found on an enemy's vessel. This liberal rule was adopted by all European nations and continued as the principle of maritime warfare until superseded by the rule embodied by the Declaration of Paris in 1856, which was to the effect that the goods of an enemy (contraband of war excepted) under a neutral flag, and neutral goods (contraband excepted) under an enemy's flag, are free from capture.

Several forms or gradations are now recognized — absolute, perpetual and armed neutrality. It is not a violation, however, of neutral duty to discharge the duties of humanity to either belligerent. The foundation of the neutrality policy of the United States was laid during Washington's administration when, upon the outbreak of war between England and France, the President issued a public proclamation, after consideration of all obligations to France under the Treaty of 1778, that the United States would remain neutral, and warned all

citizens of the United States to abstain from giving aid to either belligerent.

**Neutral Nation,** an Indian tribe related to the Iroquois. When discovered by the French they were living on the north shore of Lake Erie in Ontario and extended eastward as far as the Genesee River in New York. Their original name is not known. The French called them the Neutral Nation because they remained neutral in the wars between the Iroquois and the Huron. In 1651 the tribe was totally destroyed by the Iroquois.

**Ne'va,** a river of Russia, connecting Lake Ladoga with the Gulf of Finland, into which it empties. It discharges into the gulf by several mouths, which are separated by islands. Its length from Lake Ladoga to St. Petersburg is 40 m., and its breadth is from 800 to 2000 ft. The river is navigable its entire length and is an important waterway connecting the interior of northern Russia with the sea.

**Nevada,** *Ne vah' da,* THE SAGEBRUSH STATE, one of the Mountain States, is bounded on the n. by Oregon and Idaho, on the e. by Utah and Arizona and on the w. and s.w. by California. That part of the state south of the 39th parallel has the shape of a triangle with an irregular apex.

SIZE. The extreme length from north to south is 483 m. and the greatest breadth is 320 m. The area is 110,690 sq. m., of which about 869 sq. m. are water. Nevada is a little larger than Colorado, less than half the size of Texas, about the size of the New England States and Pennsylvania combined and the sixth state in area.

POPULATION. In 1910 the population was 81,875. From 1900 to 1910 there was a gain in population of 39,540, or 93.4 per cent. The number of inhabitants to the square mile is .7, and the state's rank in population, including the District of Columbia, is 49.

SURFACE. The northern part of the state consists of a plateau 4000 ft. in altitude lying between the Sierra Nevada Mountains on the west and the Wasatch Mountains on the east. Numerous parallel ranges from 20 to 50 m. apart and varying in altitude from 6000 to 8000 ft. run north and south through the state. These are broken by passes and valleys. In the southwestern portion is an alkali plain over which a few mountains are scattered. In some sections there are ranges extending in a general east and west direction. The highest point in the state is Wheeler Peak, 13,058 ft., near the central point of the eastern boundary.

RIVERS AND LAKES. In the southwestern part of the state there are no rivers of importance. The Humboldt, rising in the northeast and flowing across the state to Humboldt Lake, is the principal stream. The Walker, Carson and Truckee rivers rise in the Sierra Nevadas and flow into lakes in the west-central part of the state. In the north is the Owyhee River, flowing into the Snake, thence to the Columbia.

Nevada contains several lakes. Pyramid Lake, 35 m. long and 10 m. wide, is the largest. Lake Tahoe, on the western boundary, is the most noted because of its remarkable beauty. This charming mountain lake is over 5000 ft. above the sea and is 21 m. long. Other lakes are Mud, Carson and Walker.

CLIMATE. Nevada has a mild temperate climate and the air is dry and healthful. The state is subject to great extremes of heat and cold, but these are not of frequent occurrence. The average temperature for winter is about 28° and for summer, about 71°. The rainfall is very unevenly distributed, most of the rain occurring between December and May. Nevada is the most arid state in the Union, the average rainfall being less than 12 inches. In some sections rain never falls.

MINERALS AND MINING. Nevada contains rich deposits of gold and silver, besides lead, copper, quicksilver, nickel, sulphur, gypsum, salt and borax. Near Virginia City is the famous Comstock lode, a vein containing deposits of gold and silver, which at one time produced over $38,000,000 worth of bullion in a year, and a total of $700,000,000 since

1860. The annual output of gold is now over $15,000,000; and of silver, over $7,000,000. The most important fields are in the vicinity of Tonopah. Among the building stones are limestone, granite, slate, sandstone and marble. Some lignite coal is also mined on the Elko River.

Agriculture. Owing to the lack of rainfall and distance from markets, agriculture is not a leading industry in Nevada. The soil, however, is fertile, and good results are obtained in the irrigated sections. Numerous farms are found in the Valley of the Humboldt River and in the west-central parts of the state. The chief field crops are hay, spring wheat, oats, potatoes and vegetables. Apples, peaches, plums and pears of excellent quality are raised. Live-stock raising is an important branch of agriculture in those sections where there is an abundance of prairie grass, and large numbers of cattle and sheep are raised. Cashmere and Angora goats are also raised to a limited extent. Undoubtedly when present plans for constructing irrigation projects are carried out, Nevada will become an important agricultural state.

Manufactures. The principal manufactures are railway cars, dairy products, flour and gristmill products, saddlery and harness, clothing, chemicals, boots and shoes, brick and tile, wagons and carriages, confectionery, liquors, lumber products and salt. Closely connected with the mining industry are the smelting and refining of ores and the making and repairing of mining machinery and tools. The lack of good railway facilities has prevented any great development of manufacturing.

Transportation. The principal line of railway in Nevada is the Southern Pacific, which crosses the northern portion of the state from east to west. This road has a branch line running northward from Reno, and one southward to Walker Lake. The southeastern part of the state is crossed by the San Pedro, Los Angeles & Salt Lake road, but much of this region is without railway lines.

Government. The constitution which was adopted in 1864 is still in use. The executive department consists of a governor, lieutenant-governor, secretary of state, treasurer, comptroller, superintendent of public instruction, surveyor-general and attorney-general, each elected for four years. The Legislature consists of a Senate and House of Representatives, the combined membership of these houses being limited to 75. The Senate cannot have less than one-third nor more than one-half of the number of members in the House. Senators and representatives are elected for two years. Sessions are biennial and limited to 60 days. The Legislature convenes on the third Monday of January of odd years.

The judicial department consists of a Supreme Court, District Courts and justice courts. There are also various courts in cities and towns.

Education. Nevada has a good system of public schools with high schools in all important towns. The schools are in charge of a state board of education, a superintendent of public instruction and five deputy superintendents. Education is compulsory. The state university and agricultural experiment station are at Reno.

State Institutions. The state hospital for the insane is at Reno, the orphans' home at Carson City and the penitentiary at Carson City.

Cities. The chief cities are Carson City, the capital; Reno, Goldfield, Tonopah, Ely, Elko and Sparks.

History. Nevada, the Spanish "snowy," referring to the Sierra Nevada Mountains, was visited by Spanish friars about 1775, by trappers, some 50 years later, and by Fremont in 1843. It came to the United States by the Treaty of Guadalupe Hidalgo. Having established a camp in 1848, Mormons prospered until 1856. The discovery of silver, 1859, caused Nevada Territory to be organized out of Utah, west of 113°, in 1861. It became a state in 1864, and its area was added to until 1866. The recent discovery of gold in new localities has given new impetus to the state's industrial life. Consult Bancroft's *Nevada and Her Resources.*

GOVERNORS. H. G. Blasdel, 1865-1870; L. R. Bradley, 1871-1878; J. H. Kinkhead, 1879-1882; Jewett W. Adams, 1883-1886; Christopher C. Stephenson, 1887-1889; Frank Bell, 1890; R. K. Colcord, 1891-1894; John E. Jones, 1895; Reinhold Sadler, 1895-1902; John Sparks, 1903-1906; D. S. Dickerson, 1907-1910; T. L. Oddie, 1911-1915; Emmet Boyle, 1915—. James W. Nye was territorial governor from 1861 to 1864.

**Nevada, Mo.,** a city and the county seat of Vernon Co., 103 m. s. of Kansas City and about 30 m. s.e. of Des Moines, Iowa, on the Missouri, Kansas & Texas, the Missouri Pacific and other railroads. Zinc mines are worked in the vicinity, and in the surrounding farm district much attention is given to stock raising. In the town are large zinc smelters, ironworks, flour and feed mills, a foundry and saw and planing mills. Notable features of the city are St. Francis Academy (Roman Catholic); Cottey College for young women, founded in 1884 and controlled by the Methodist Episcopal Church (South); the state hospital for the insane; an orphans' asylum; and Lake Park Springs on the borders of a beautiful lake near the city limits. Settled about 1830, Nevada was incorporated about 1865, and in 1883 was chartered as a city. Population in 1910, 7176.

**Nevada State University,** at Reno (1873). This institution was founded at Elko in 1873, removed to Reno in 1885 and formally reopened the next year. It is the one institution of college grade maintained by the state, and therefore includes a normal department. It has also a school of mines at Virginia City. The university proper offers the usual courses in its colleges of agriculture, of arts and sciences and of applied science. It has a library of some 20,000 volumes. In 1910 it reported about 350 students.

**Nev'in, Ethelbert** (1862-1901), an American composer, born at Edgeworth, Pa. He studied in America and in Berlin, and spent much of his time between 1893 and 1900 in Europe. In the latter year he became associated with H. N. Parker in the department of music at Yale University. His works consist of compositions for the piano, and songs, and are characterized by delicacy and originality. Among his well-known compositions are *Narcissus* (in the group *Water Sketches*), four pieces in the collection entitled *A Day in Venice,* and the song, *The Rosary.*

**New Albany, Ind.,** a city and county seat of Floyd Co., opposite Louisville, Ky., on the north bank of the Ohio River, 2 m. below the falls and on the Baltimore & Ohio Southwestern, the Chicago, Indianapolis & Louisville, the Pittsburgh, Cincinnati, Chicago & St. Louis and other railroads. A railroad bridge across the river connects the city with Louisville. New Albany is an important manufacturing center having engine and boiler works, furniture factories, plate-glass works, iron foundries, rolling mills, cutlery and edge-tool works, flour mills, woolen and cotton factories and extensive pork-packing establishments. De Pauw College for women, St. Mary's Academy and Holy Trinity Academy (Catholic) are located here. There is also a National cemetery near the limits of the city. The town was settled in 1813 and received a city charter in 1839. Population in 1910, 20,629.

**New'ark, N. J.,** a port of entry, county seat of Essex Co., and metropolis of the state, on Newark Bay and the Passaic River, 8 m. w. of New York City, and on the Pennsylvania, the Delaware, Lackawanna & Western, the Erie, the Lehigh Valley and the Central of New Jersey railroads. Various steamboat lines are engaged in coastwise trade; the Passaic River flowing into Newark Bay furnishes the city with a direct waterway to the ocean. There is a water frontage of over 10 m., and the city contains a total area of about 23 sq. m. Numerous local trains and electric cars connect with the ferries and tunnels to New York City. Interurban lines also connect with Paterson, Jersey City, Rutherford and the residential suburbs, including Nutley, Montclair, Irvington, Belleville, Glen Ridge, the Oranges and Bloomfield.

Newark ranks 15th among the most important manufacturing cities of the United States.

Parks and Boulevards. Broad and Market streets are the principal thoroughfares of the city. Washington, Lincoln and Military parks are the older city parks; Branch Brook, West Side, East Side and Weequakic of 265 acres are among the more recently added parks of the city system. There are over 225 m. of streets and an excellent waterworks plant owned by the city. Newark contains a large percentage of home owners. Mt. Pleasant, the Holy Sepulchre and Fairmount are the principal cemeteries.

Public Buildings. Among the noteworthy buildings are the county courthouse, built in 1899, the Federal Building, city hall and a public library. The Prudential, Firemen's Insurance, Kinney, Bamberger and Mutual Benefit banks and business corporations have fine office buildings. There are about 173 churches, including a Catholic cathedral. Newark is the seat of a Catholic see and of an Episcopal bishopric.

Institutions. Newark Academy, founded in 1792, is one of the leading educational institutions. The city maintains about 12 vacation or summer schools, a school of drawing, a normal and a technical school as a part of its public school system. There are a large number of private schools, which include St. Vincent's Academy and St. Benedict's College. The New Jersey Historical Society has a collection of great historical value. The Essex County Lawyers' Club and the Prudential Insurance Company also own valuable law libraries. Among the benevolent and charitable institutions, which number about 75, are St. Michael's, St. Barnabas, St. James, German, the city and babies' hospitals, an Eye and Ear Infirmary, Home for Crippled Children, House of the Good Shepherd, Newark Orphan Asylum, a home for aged women and several day nurseries. The city is the seat of the Essex County Hospital for the Insane. At Verona, near the city, is the City Home for boys, in which farming and various trades are taught.

Industries. Newark has long been noted for its manufacture of leather products. The making of patent leather early became an important industry, and the manufacture of celluloid is peculiar to the city. Other extensive manufactures include malt liquors, felt hats, chemicals, clothing, boots and shoes, saddlery and harness, chairs, carriages, stamped ware, enameled goods, jewelry, silverware, cigars, buttons, trunks and valises, thread, watchcases and varnishes. There are also smelting and refining plants for refining lead and copper. An art pottery was established in 1905. Insurance is an important business, a large number of companies having headquarters here.

History. The first settlement was made in 1666 by a small company of Puritans from Milford, Conn., and named in honor of Rev. Abraham Pierson, whose old home was at Newark-on-Trent and who had accompanied the settlers to found a new home. By 1685 Newark was a compact town of about 500 inhabitants and continued essentially Puritan for more than 50 years. Partly on this account and partly on account of independent industrial interests, Newark has kept a separate character of its own in spite of its proximity to New York City. Newark was first incorporated in 1693 and received its first city charter in 1836. Another charter was granted in 1857. Population in 1910, 347,469.

**Newark, Ohio,** an important city and county seat of Licking Co., 33 m. n.e. of Columbus at the junction of three forks of the Licking River, on the Ohio Canal and on the Pennsylvania, the Baltimore & Ohio and other railroads. There is excellent interurban electric service to Columbus, Dayton, Springfield, Granville and many other towns and cities. Newark is situated on a level plain surrounded by hills and is the center of a great gas field. Coal fields are also located to the east and south, a distance of about 25 m. Buckeye Lake, 10 m. to the southwest, is one of the most attractive

and popular summer resorts of the state. Newark is attractively laid out and contains broad, well-paved and shaded streets and handsome residences with lawns and gardens. Idlewilde, Sixth Street and Moundbuilders parks are the largest of the park system. Cedar Hill and Mt. Calvary are beautiful cemeteries adjoining the city.

Among the noteworthy buildings are the Soldiers' and Sailors' Memorial Building, Auditorium, courthouse, Y. M. C. A. Building, Federal Building, Elks' Club Building, good business houses and New Country Club Building. There are over 24 churches. The educational institutions include a high school, public and parochial schools and a public library. Other institutions include a city hospital and the Licking County Children's Home.

Newark is essentially a manufacturing city, its principal products including bottles, stoves, table glassware, art glass, reflectors, shoes, street cars, oil tanks, cigars, steel rails, sleigh runners, hardwood finish, soap, halters, safes, kitchen utensils, furniture, fertilizers, harness, wire cloth, boilers, furnaces, flour, golf sticks, brick, flavoring extracts, clover hullers, engines, boilers and motor trucks. Tributary to the city are fertile agricultural sections, and there is an important trade in live stock and farm and dairy products.

Ancient earthworks of the mound builders are located in Newark. These earthworks occupy about three square miles and have a great variety of forms. Newark was settled in 1801 and laid out as a town in 1802. Population in 1910, 25,404.

**New Bed'ford, Mass.,** a city, port of entry and one of the county seats of Bristol Co., 56 m. s. of Boston, at the mouth of the Acushnet River at the head of New Bedford Harbor, an arm of Buzzard's Bay, and on two divisions of the New York, New Haven & Hartford Railroad. It is connected with Fall River, Onset, Brockton, Dartmouth, Taunton, which is the other county seat, and other places, by interurban electric lines. Steamer lines also connect daily with New York, Martha's Vineyard, Nantucket and Buzzard's Bay points. Ft. Rodman, on Clarke's Point, defends the entrance to the harbor. The city has an area of 20 sq. m. A four-mile drive around this point commands splendid marine views. New Bedford, which is connected by bridges with Fairhaven, is noted for the elegance of its private residences and public buildings.

Among the prominent structures are the public library, which is one of the oldest institutions of the kind in the country, a high school, St. Luke's and St. Joseph's hospitals, a state textile school and St. Mary's School and Home. The Sailor's Bethel, built in 1831, and containing memorial tablets reminiscent of the whaling days, is of interest. There are six large public parks. New Bedford, once noted for its extensive whaling interests, has grown to be an extensive manufacturing center. At one time the place was the principal port of the world's whaling industry and still holds first place with a fleet of about 20 vessels. The prosperity of New Bedford is now largely due to the cotton-spinning industry. The cotton and yarn mills are among the largest in the world and have given the city a leading position in the manufacture of fine cotton goods and cotton yarns. This industry has an invested capital of about $40,000,000. Among the manufacturing establishments are shoe factories, woolen mills, glassworks, lubricating-oil works, cordage works, silverware works, machine shops, paint and candle works, paper mills and soap factories. Much coal is shipped here.

The first settlement was made in 1652 by Plymouth colonists, and it was a part of Dartmouth until its incorporation in 1787. New Bedford occupied a prominent place in the Revolution. It was granted a city charter in 1847. Population in 1910, 96,652.

**New'bern, N. C.,** a city, port of entry and the county seat of Craven Co., 87 m. n.e. of Wilmington, at the head of the estuary of the Neuse River at the

mouth of the Trent River, and on the Atlantic Coast Line, the Norfolk & Southern and other railroads. Navigation facilities have been increased by improvements made by the Federal Government, and the city has steamboat connection with Norfolk, Baltimore and New York, and has a considerable commerce. Both railway and highway bridges cross the river at this point. The leading activities are trucking and the manufacturing of lumber, chiefly pine; and the fisheries involve large interests. Other manufactures include knit goods, hosiery, carriages, barrels, fertilizer, turpentine, cottonseed oil, canned goods and pickles. Machine shops, a lime kiln and shipyards are in operation. The city ships considerable quantities of lumber, fish, cotton and market-garden produce. Among the points of interest are the Government Building, the courthouse and places associated with the city's early history. Newbern was settled in 1710 by a colony of Swiss and Germans, was incorporated as a city in 1723 and was for a time the capital of the Province of North Carolina. In March, 1862, it was captured by General Burnside after severe fighting. Population in 1910, 9961.

**New Brighton,** *Brī' tun,* **Pa.,** a city of Beaver Co., 28 m. n.w. of Pittsburgh, on the east bank of the Beaver River, 2 m. from its junction with the Ohio, and on the Pittsburgh, Ft. Wayne & Chicago and the Pittsburgh, Youngstown & Ashtabula divisions of the Pennsylvania Railroad. Coal fields and fire-clay beds are in the vicinity. It is connected by bridge with Beaver Falls. New Brighton is an important industrial center on account of its excellent water power, and has manufactories of brick, pottery, sewer pipe, glass, twine, coffee mills, nails, rivets, wall paper, bath tubs, fire engines, brass castings, chains and other commodities. The Beaver Valley General Hospital is located here, and also the public art gallery, library and a public park. The town was settled in 1709 and incorporated as a borough in 1838. Population in 1910, 8329.

**New Britain,** *Brit' 'n,* **Conn.,** a city of Hartford Co., 9 m. s.w. of Hartford, on the New York, New Haven & Hartford and other railroads. The city is situated near the center of the state in an agricultural region and has an area of over 13 sq. m. Several interurban electric lines connect the city with the near-by towns and villages. The surrounding country is largely agricultural and the city is an important distributing and manufacturing center. New Britain is well laid out, with broad and shaded streets, and there are many attractive residences. There is a public park system, the largest of the parks containing about 100 acres. The city is the seat of a state normal school and contains a high school, public and parish schools and a public library, formerly the New Britain Institute. There are a large number of fine churches, including a Catholic cathedral. The most important manufactured products include hardware, cutlery and edge tools, hot-air registers, hosiery, knit goods, saddlery and harness, stamped ware and foundry and machine-shop products.

New Britain was settled in 1867 and remained a part of Berlin until 1850, when it was incorporated as a town. A city charter was granted in 1871. By act of the State Legislature in 1905 the Township of New Britain and the city of New Britain were united. The city was one of the first in the country to build a subway for telegraph, telephone and electric-light wires. Elihu Burritt, known as the learned blacksmith, was born in New Britain. Population in 1910, 43,916.

**New Brunswick,** *Brunz' wik,* a province of the Dominion of Canada, bounded on the n. by the Province of Quebec and the Bay of Chaleurs, on the e. by the Gulf of St. Lawrence, on the s. by Nova Scotia and the Bay of Fundy and on the w. by Maine and the Province of Quebec. Its length from north to south is 210 m. and its greatest breadth is 190 m. The area is 27,985 sq. m. It is a little more than one-half the size of England and a little smaller than Scotland, one-

third larger than Nova Scotia and about the size of Vermont, New Hampshire and Massachusetts combined. Population in 1911, 351,888.

Surface. Ranges of hills or low mountains extend from Maine across the northwestern part of the province. These are a prolongation of the Appalachian Mountains. They range in altitude from 1000 to 2000 ft. and reach their highest elevation in Bald Mountain (2400 ft.) Along the Bay of Fundy the coast is high and rocky and contains numerous ravines. The eastern coast is low, and this coastal plain extends inland for several miles, where it rises to gently sloping hills. The central part of the province is generally rolling. The coast has numerous bays which form excellent harbors. Chignecto Bay, which forms the head of the Bay of Fundy, is noted for its high tides, which rise over 50 ft. There are excellent harbors on Miramichi Bay and the Bay of Chaleurs, and most of the rivers are navigable for several miles, so that each river estuary affords shelter for shipping.

Rivers and Lakes. The St. John, having a length of about 500 m., is the principal river. It flows into the Bay of Fundy and is navigable for light vessels to Fredericton, a distance of 88 m., and for small steamers 65 m. further. Its broad estuary is 50 m. long. Other streams of importance are the St. Croix, Miramichi, Restigouche, Petitcodiac and Richibucto, all navigable for greater or less distances. The land is a network of small streams and lakes, which are favorite haunts of anglers and sportsmen.

Climate. The climate is healthful and bracing, though subject to extremes of heat and cold. The mean summer temperature is about 60° F. and for the winter it is 19°. The autumns are remarkably pleasant. The annual rainfall is a little less than 33 inches. During winter snow falls to a great depth, the average being 97.5 inches for the season.

Forests and Lumber. Originally New Brunswick was almost entirely covered with forests, and large areas are still forested with valuable timber trees, including black spruce, hemlock, cedar, birch, beech, oak and other varieties. The black spruce is extensively used in the manufacture of wood pulp. The general distribution of forests over the province, the excellent harbors and numerous navigable streams have combined to make New Brunswick an important lumber region, and the production of lumber and lumber products constitutes the chief manufacturing industry.

Agriculture. On the lowlands and along the streams the soil is highly fertile, and these localities contain many highly developed farms. All crops of a cool, temperate climate are successful. Dairying is an important and growing industry and increased attention is being given to raising live stock for market. In some localities quantities of small fruits are grown for New England markets.

Fisheries. Catching and curing fish form one of the important industries. The chief centers are in Charlotte and Gloucester counties. Cod, herring, salmon, lobsters and sardines are taken in large quantities, and the streams in the northern part of the province are favorite haunts of game fish.

Other Industries. Coal is mined in small quantities for local consumption and large quantities of limestone and gypsum are quarried near St. John. Aside from industries directly connected with lumbering, manufactures are few and consist chiefly of the manufacture of furniture and making butter and cheese, an industry so closely allied to agriculture that it can scarcely be separated from it.

Transportation and Communication. The Intercolonial Railway, owned and operated by the Federal Government, connects the province with Nova Scotia on the east and the other Canadian provinces on the west, and there are branches connecting St. John and Fredericton with the main line. The Canadian Pacific and Grand Trunk Pacific extend through the province, the former, in connection with the Maine Central, forming a line to the United States. The

navigable rivers are fully utilized as a means of transportation, and a number of lines of steamers ply between St. John and ports in the United States and Nova Scotia, and with the chief ports of Great Britain.

GOVERNMENT. The chief executive is the lieutenant-governor, appointed by the governor-general of Canada for five years. He is assisted by an advisory council consisting of the heads of the various departments of the provincial government, and appointed by himself. The Legislature consists of an Assembly of 46 members. The judges of the courts are appointed by the Dominion Government for life.

EDUCATION. A system of free undenominational schools was established in 1871, and there are excellent elementary and secondary schools throughout the province. A normal school and a school for the deaf are maintained at Fredericton. Mt. Allison College (Methodist) is at Sackville, and there is a French College under the auspices of the Catholic Church at Memramcook.

CITIES. The chief cities are Fredericton, the capital; and St. John.

HISTORY. The coast of New Brunswick was explored by Sebastian Cabot in 1498. Later it formed a part of the French Province of Acadia. The first settlement within its borders was made at the mouth of the St. Croix River in 1604, by Pierre de Guast and Sieur de Monts, but the colony was soon abandoned. The Province of Acadia continued until 1713, when by the Treaty of Utrecht it came under control of Great Britain. In 1762 the first English settlement was made at Maugerville on the St. John River. Two years later a settlement was formed on the Miramichi by some Dutch farmers, and in 1783 and the years immediately following, a large number entered the province from the United States because they preferred to live under British rule. In 1784 New Brunswick became a separate province and so continued until the formation of the Federation in 1867, when it became a province of the Dominion of Canada.

**New Brunswick, N. J.,** county seat of Middlesex Co., 31 m. s.w. of New York City and 23 m. s.w. of Newark, on the Raritan River at the head of navigation, the terminus of the Delaware and Raritan Canal, and on the Pennsylvania and Raritan River railroads. The Pennsylvania Railroad here crosses the Raritan River on a magnificent stone bridge and is carried through the city on a viaduct. Rutgers College, the Theological Seminary of the Dutch Reformed Church in America, organized in 1766; and the New Jersey State Agricultural and Mechanical College with the state model farms, which is connected with Rutgers, are located here. St. Agnes Academy, St. Mary's Orphan Asylum and Home for the Aged, and the Gardner A. Sage Library are other important institutions.

New Brunswick is a manufacturing city and has good shipping facilities by land and water. It has vast laboratories and extensive manufactories of India-rubber goods, paper hangings, carpets, hosiery, boots and shoes, harness, surgical supplies, knitting machines, musical strings, fruit jars, etc. The town was settled in 1681 and first called Prigmore's Swamp, then Inion's Ferry. The name was again changed in 1714 and called New Brunswick after the House of Brunswick. It was the scene of great activities during the Revolutionary War. In 1730 it was granted a royal charter and in 1784 was chartered as a city. Population in 1910, 23,388.

**New'burgh, N. Y.,** a city of Orange Co., 57 m. n. of New York and 83 m. s. of Albany, on the west bank of the Hudson River, which here expands into Newburgh Bay, and on the Erie and the West Shore railroads. Steam ferries across the river connect the city with the New York Central & Hudson River and the Central New England railroads at Fishkill. An electric railway line connects with the village of Walden 12 m. northwest. The city occupies a commanding position on terraced slopes, rising over 300 ft. above the river, and has magnificent views of the Hudson High-

lands to the south and of the Catskill Mountains on the northwest. The city is an important port for various lines of Hudson River steamers, which ply between New York and Albany. Orange Lake, between Newburgh and Walden, is noted for its ice yachting and skating races. Newburgh is situated in an agricultural region, the adjacent country being widely known for its extensive dairies and the superior quality of butter produced in them.

The city, as viewed from the river, presents an attractive appearance with its broad streets, lined with trees and foliage, and fine public buildings. Washington Park is in the central part of the city, and Downing Park lies on a high plateau overlooking the city and the surrounding country. Clinton Square contains a statue of Gov. George Clinton. The educational institutions include the Newburgh Academy, St. Patrick's and Mount St. Mary's academies and a public library. The city also contains St. Luke's home and hospital, home for the friendless, home for children, a Y. W. C. A. Building, and a new Y. M. C. A. Building just completed, costing $90,000.

Newburgh is of considerable importance as an industrial center and has extensive manufactories of cotton and woolen goods, felt hats, silk goods, paper, laces, plush goods, mill machinery and agricultural implements. There are also foundries and machine shops, brickworks, carpet mills, tanneries and leatherette works. The shipyards are the largest along the Hudson. Large quantities of coal from Pennsylvania shipped to tidewater are here transferred to barges and coasting vessels.

Newburgh was first settled in 1709 by a colony of Germans from the Rhenish Palatinate, and was known as the "Palatine Parish of Quassaic." In 1750 the Germans had been replaced by people of Scotch and English descent, who renamed the place Newburgh after Newburgh, Scotland. The city occupied a prominent place in the history of the Revolutionary War and was the headquarters of the American army from March, 1782, until August, 1783. Washington made his headquarters at the Hasbrouck House, which was purchased by the state in 1849 and is now used as a museum for Revolutionary relics. It was here on May 27, 1782, that Washington wrote his famous letter of rebuke to Lewis Nicola, who had written him suggesting that he become king. On the grounds surrounding the headquarters is the Tower of Victory, erected by the United States and state governments to commemorate the close of the war. Newburgh was incorporated as a village in 1800 and chartered as a city in 1865. Population in 1910, 27,805.

**New'buryport", Mass.,** a city, port of entry and one of the county seats of Essex Co., 35 m. n.e. of Boston, on the Merrimac River, 3 m. from the Atlantic Ocean and on the Boston & Maine Railroad. The city stands on a declivity and commands a beautiful prospect. Shipbuilding is carried on to some extent. There is a considerable trade in coal brought to the city by coasting schooners. The chief manufactured products include celluloid collars and cuffs, boots and shoes, hats, combs, silverware, brushes, cordage, carriages, cottons and woolens. Among the city's noteworthy buildings are the Marine Museum, Anna Jacques Hospital and Old South Church, which contains the remains of George Whitefield. There are also homes for aged women and destitute children. In the upper part of the city the river is crossed by a chain bridge built in 1792, which was the first suspension bridge in America. Newburyport was settled in 1635 and was a part of Newbury until 1764, when it was incorporated as a town. It received a city charter in 1851. William Lloyd Garrison and Francis C. Lowell, who introduced cotton manufacturing on a large scale into the United States, were born here. Population in 1910, 14,949.

**New Cal"edo'nia,** an island in the South Pacific Ocean, in latitude 20° and 22° 30′ south and longitude 164° and 167° east. Its length from northwest to southeast is 220 m., and its breadth is 30

m. The surface is mountainous and is covered with a luxuriant vegetation, chiefly forests. The island belongs to France and is used as a penal colony. The population is about 52,000, most of whom are Papuans.

**New Castle, Ind.,** a city and county seat of Henry Co., 20 m. s. of Muncie and 40 m. n.e. of Indianapolis, on the Blue River and on the Cleveland, Cincinnati, Chicago & St. Louis, the Pittsburgh, Cincinnati, Chicago & St. Louis, the Ft. Wayne, Cincinnati & Louisville and other railroads. It is situated in an agricultural district and has natural gas, excellent water power and good transportation facilities. The chief manufactories include iron and brass works, a paper-box factory, a furniture factory, carriage and wagon shops, agricultural-implement works, brick and shovel works, a piano factory, paint works, flour mills, corn-shredder works and steel-bridge works. Population in 1910, 9446.

**New Castle, Pa.,** a city and county seat of Lawrence Co., 50 m. n.w. of Pittsburgh, on the Shenango River at the mouth of the Neshannock Creek, and on the Pennsylvania, the Erie, the Baltimore & Ohio, the Pittsburgh & Lake Erie, the Buffalo, Rochester & Pittsburgh and other railroads. Interurban electric lines connect with the near-by towns and cities. New Castle is the commercial center of a fertile agricultural region, and bituminous coal, iron ore, limestone, fire clay and sandstone abound in the vicinity. The city is attractively situated, with broad and well-paved streets, and contains many beautiful residences surrounded by lawns and gardens. Cascade Park, not far from the city, is a noted pleasure resort.

Among the noteworthy public buildings are a city hall, public library, Y. M. C. A., a high school and several parish schools, and a well-equipped hospital. There are about 53 churches and missions. The extensive manufacturing industries of New Castle are represented by tin-plate works, blast furnaces, rolling mills, cement factories, nail factories and manufactories of fire brick, stoves, plows, boilers, machinery, paper, dynamite, steel wire and lumber products. There is also considerable trade in agricultural products, and stock raising and coal shipping are important.

New Castle was founded in 1812, incorporated as a borough in 1825 and chartered as a city in 1869. A revised charter was granted in 1889. Population in 1910, 36,280.

**Newcastle-upon-Tyne,** a city and municipal county of England, the capital of Northumberland, situated on the left bank of the Tyne, 8 m. from its mouth. Among the buildings of prominence are the Guildhall, Moot Hall, Church of St. Nicholas, town hall, the postal and telegraph office, the Tyne and Royal theaters and the colleges of medicine and science connected with the University of Durham. The commerce of Newcastle is represented by handling the coal from the Northumberland and Durham regions, as well as lead and unrefined lead imported from Spain. The manufactures include soda, earthenware, vitriol, salt and other chemical products. The history of Newcastle-upon-Tyne dates from the occupation of the country by the Romans. It gained its name of Newcastle from the fact that Robert, son of William the Conqueror, began to build a castle here in 1080. Population, 266,671.

**Newcomb,** *Nu' kum,* **Simon** (1835-1909), an American astronomer and mathematician, born in Nova Scotia. He came to the United States when 18 years of age and graduated from the Lawrence Scientific School, Harvard, in 1858. In 1861 he became professor of mathematics in the United States navy, and in 1877, senior professor and director of the *Nautical Almanac.* He was secretary of the commission to observe the transits of Venus in 1871-1874 and 1882, and himself observed the transit of 1882 at the Cape of Good Hope. He also directed the observation of several eclipses. In 1897 he retired and devoted his time to scientific work. He edited the *American Journal of Mathematics,* taught in Johns Hopkins University, and was a

member of the Royal Academy and other honorable societies at home and abroad. He was president of the International Congress of Arts and Sciences at St. Louis in 1904. In 1874 he received the gold medal of the Royal Astronomical Society, in 1878 the Huygens medal, in 1890 the Copley medal, and in 1898 the Bruce medal of the Astronomical Society of the Pacific. His published works are numerous, among them several that are popular, including *Popular Astronomy, Astronomy for Everybody* and *The Stars.*

**New England Confederation,** the union between the four colonies of Plymouth, Massachusetts Bay, Connecticut and New Haven, 1643, for mutual help, and for a perpetual league, defensive and offensive, against the Indians, the Dutch, French and, if need be, against England. John Winthrop was the first president of the Confederation. For 20 years it was a great help to all the colonies of New England and it carried them victoriously through King Philip's War. However, internal dissensions and constitutional weakness led to its decline. It was dissolved in 1684.

**New England, Council for,** an organization established at Plymouth, England, for the planting, ordering, ruling and governing of New England in America. It was virtually a reorganization of the Plymouth Company of 1606 and was incorporated Nov. 3, 1620, with Ferdinando Gorges as the moving spirit. This new company granted to William Bradford the patent allowing the settlement by the Pilgrim Fathers. By the addition of Laconia, comprising parts of the present states of Maine and New Hampshire, in 1621, the territory of the new company extended from Long Island to the Bay of Fundy. This was distributed among 20 nobles.

**Newfoundland,** *Nu' fund land",* an island in the Atlantic Ocean, the tenth largest in the world. The name is applied to the whole British colony, including also the dependency, Labrador. The Strait of Belle Isle, about 12 m. wide, separates Newfoundland from Labrador, and Cabot Strait, 65 m. wide, separates it from Cape Breton Island. It is larger than Ireland, and nearly the size of Tennessee, its estimated area being 42,734 sq. m. The eastern coast is the nearest American point to Europe. Along its shores the surface is rocky and forbidding; the interior is more or less of a rough plateau, of which large sections are still unexplored. Timbered areas occur along the river valleys; marshes are frequent; and here and there the soil is fertile, yielding large tracts of grazing land and a fairly extensive farming area. Fishing is the chief industry, affording occupation to about 70,000 of the inhabitants. Its codfishery is the largest in the world; lobster, seal, salmon and herring rank next in importance. The manufactures are of minor importance; shipbuilding has long been carried on and there are several large sawmills. The trade with the United States and Canada is constantly on the increase.

A governor appointed by the Crown, a legislative council and a House of Assembly control the affairs of the island. The chief religious denominations represented are Roman Catholic, Episcopalian and Methodist. The educational system is not compulsory, and is almost entirely controlled by the Churches. The earliest history of Newfoundland connects with the discovery of the island by John Cabot in 1497, and the English settlements made on it later. By this time, however, the codfisheries had attracted the attention of the French and Portuguese, and contests for supremacy followed. By the Treaty of Utrecht, in 1713, the sole right of possession, excluding the isles of Miquelon and St. Pierre, was granted by France to England. The two isles were used as stations by the French fishing fleet. In 1832 Newfoundland received a representative government. St. John's, the capital, has a population of 29,504. The interior of the island is practically uninhabited. Population in 1911, 242,966.

**Newfoundland Dog,** a large spaniel, which derives its name from the island

in which it is native. It is a large, shaggy-coated dog, of mild disposition and benevolent expression. In color it is usually black, but it may be white with tan or black markings; often the head and ears are black, while the muzzle is white and a white line runs up the forehead. The shoulders are broad and powerful, the limbs strong and the tail long and shaggy; the eyes and ears are rather small, but its whole aspect is that of alert and intelligent interest. Its feet, like those of all spaniels, are webbed, and it is an active and excellent swimmer. It is fond of the sea, and many a boat carries its big Newfoundland, which proves to be no idle friend in case of danger. It has developed a determined instinct for life-saving and shows marvelous skill and sagacity in its powers of rescue. In sport the Newfoundland is a good retriever, an intelligent companion and an obedient assistant. For its usefulness to mankind it vies with the noble St. Bernard.

**New Guinea,** *Gin' y,* or **Papua,** *Pap' oo a,* a large island of the East Indian Archipelago lying north of Australia, from which it is separated by Torres Strait. It is slightly larger than the combined areas of California and Montana. The western portion belongs to the Dutch and the eastern to the British and Germans. Until recently the island had been slightly explored, but was known to have lofty mountains in the interior and to be inhabited by many warlike tribes wholly unacquainted with European civilization. The explorations carried on by British scientists have shown that the island is rich in animal life, and within its comparatively small area are found more varieties of birds and insects than are known in Australia. The people of New Guinea differ greatly in manner of life, and two tribes living only a few miles from each other often speak an entirely different language. Their principal food is sago; hunting and fishing are carried on and trading in pottery is practiced. Their houses and temples are thatched structures built upon piles and entered by means of a notched pole, which takes the place of a stairway. The population is estimated at 800,000.

**New Hamp'shire,** The Granite State, one of the New England States and the most northerly of the thirteen original states, is bounded on the n. by the Province of Quebec, on the e. by Maine and the Atlantic Ocean, on the s. by Massachusetts and on the w. by Vermont and the Province of Quebec. The Connecticut River runs nearly the entire length of the western boundary and belongs to the state. The form is that of an irregular triangle with the northern apex cut off.

Size. The greatest length from north to south is 180 m. The greatest width is 100 m. and the area is 9341 sq. m., of which 310 sq. m. are water. New Hampshire is between Vermont and Massachusetts in size, making it the third of the New England States in area, and the 43rd state in the Union.

Population. In 1910 the population was 430,572. Between 1900 and 1910 there was a gain of 18,984, or 4.6 per cent. There are 47.7 inhabitants to the square mile and the state ranks 39th in population.

Surface. The White Mountains, covering an area of about 1400 sq. m. and lying north of the center, form by far the most striking physical feature, not only of New Hampshire, but also of New England. Mt. Washington, 6286 ft., is, next to Mt. Mitchell in North Carolina, the highest peak of the Appalachian system (See White Mountains). The northern part of the state is rugged and mountainous, but south of the White Mountains the region is characterized by low hills and broad valleys, with now and then an isolated dome of sufficient height to be styled a mountain.

Rivers and Lakes. The Connecticut, flowing along the western part of the state, is the longest and largest river and drains the western part. Its most important tributaries, going from the north southward, are the Upper and the Lower Ammonoosuc, the Mascoma, the Sugar and the Ashuelot. The Andros-

coggin drains the northeastern section; the Saco, the region farther south. The Salmon Falls River forms part of the boundary between Maine and New Hampshire and enters the Atlantic Ocean through the broad estuary of the Piscataqua, which forms the only harbor in the state. The Merrimac drains the south-central part of the state and is one of the most important streams.

Of the numerous mountain lakes, Winnepesaukee in the central part of the state, having an area of over 70 sq. m., is the largest and most important. Others in order of size are Umbagog, which is partly in Maine; Squam and Sunapee.

Scenery. For more than a century New Hampshire has justly been famous as the "Switzerland of America." The scenic features of the White Mountains, in which the Saco and the Pemigewasset form respectively the Crawford and Franconia notches, have been attractive to tourists ever since they were accessible, and they are known far and wide for their beauty and grandeur. Lake Winnepesaukee is remarkable for its irregular shores and the large number of islands it contains. The entire state is diversified by hill and valley, precipitous cliffs and mountain glens, through which flow sparkling streams with frequent cascades.

Climate. The state has a cool temperate climate; in the north the winters are long and severe, but in the south they are more mild. The summers are cool and pleasant, with rare hot days in which the thermometer may rise to 90° or thereabouts. The mean temperature of the year is 41°, 17° for the winter and 65° for the summer. The average rainfall is 40 inches. In the northern part of the state and among the White Mountains there is a heavy fall of snow and in some of the mountain gorges snow remains throughout the year.

Minerals and Mining. The state contains extensive ledges of granite, which is quarried in large quantities. It is also the leading state in the production of mica, the output being fully four-fifths of that quarried in the United States. Soapstone is also quarried in large quantities. Limestone, porphyry and other building stone are found.

Forests and Lumber. The lower slopes of the White Mountains are covered with forests of hard and soft woods. The hills and mountains in the northern part of the state were also heavily forested, but much of the timber there has been cut off. Lumbering, however, is carried on to a considerable extent for supplying local needs and raw material for numerous hardwood products. Although this industry is not so extensive as formerly, it is still fourth in the state.

Agriculture. Agriculture is one of the leading industries. Over 60 per cent of the land is under tillage. The farms are small, most of them being tilled by their owners, and diversified farming is largely practiced.

*Soil.* Along the streams the soil is deep and highly fertile, but on the uplands it is less productive. Throughout those deforested regions that have been cultivated good crops have been raised.

*Products.* Hay, oats and potatoes are the chief field products in the northern part of the state. South of the White Mountains garden vegetables and fruit are grown successfully. Dairy husbandry and poultry-raising are also important branches of agriculture throughout the state.

Manufactures. The numerous streams furnish abundant water power and manufacturing is the leading industry. Natural power sites have determined the location of many manufacturing centers. The most extensive of these are on the Merrimac, especially at Manchester and Nashua. Woolen and cotton mills are located so extensively along this stream in New Hampshire and Massachusetts that the Merrimac River is said to turn more spindles than any other river in the world. The manufacture of boots and shoes is the leading industry, with an annual output of about $23,500,000. The manufacture of cotton goods ranks second, with an annual output of about $23,000,000. The Amoskeag Corporation at Manchester is the largest sin-

gle establishment in the world for the manufacture of cotton goods. Woolens rank third with an output equaling in value about one-half of that of cotton manufactures. Lumber ranks fourth and is the oldest manufacturing industry, the first sawmill in New Hampshire having been erected in Portsmouth in 1635. The lumber mills at Berlin and Lincoln are among the most complete in the United States. Wood pulp, hosiery and other knit goods, machinery and small wares in great variety are produced in large quantities. The total manufactures have a yearly value of about $200,000,000.

Transportation and Commerce. Portsmouth is the only seaport, but the state is well supplied with railways which are included under three systems,the Boston & Maine, the Grand Trunk and the Maine Central. These systems with connecting cross lines supply all towns, except those in the extreme north, with ample railroad facilities. A line of the Boston & Maine extends through Crawford Notch in the White Mountains, and a cogwheel railroad, the first of its kind, extends to the summit of Mt. Washington and is operated during the summer for the benefit of tourists. In the southern and central parts of the state electric lines connecting near-by towns are being extended year by year. Summer travel is heavy because thousands of people from Boston, New York and other cities seek relief in the hamlets and on the farms of this delightful region.

New Hampshire has an extensive commerce. Her manufactured products are found in the markets of the world and her farm products find ready sale in Boston and the manufacturing centers within the state. The imports consist chiefly of foodstuffs and raw material for manufactures.

Government. The governor and a council of five members, elected by popular vote, and a secretary of state, treasurer and commissory-general, chosen by joint ballot of the Senate and House of Representatives, constitute the executive department. The Legislature, or General Court, consists of the Senate of 24 members, distributed among 24 senatorial districts, and a House of Representatives, apportioned according to population. All cities and towns having 600 inhabitants are entitled to one representative for each legislative term. Cities and towns having less than 600 inhabitants are entitled to a representative for such part of the legislative term, occurring in each ten years, as their number of inhabitants is of 600; that is, a town having 360 inhabitants would have a representative in three of the five legislative terms occurring in each ten years. All members of the Legislature and all state officers are elected for two years.

The judicial department is vested in a Supreme Court consisting of one chief justice and four associate justices, and a Superior Court with one chief justice and four associate justices. The justices are appointed by the governor and confirmed by the council. The Supreme Court determines issues of law transferred from the other courts, and holds monthly sessions at Concord, except in the three summer months. The justices of the Superior Court hold court in the different counties during the year, and each county has a Probate Court. Municipal and local courts exist in the cities and larger towns.

Education. Public schools are under the direction of the superintendent of public instruction, who is appointed by the governor and confirmed by the council. The township is ordinarily the unit for the administration of rural schools. Cities and villages have excellent grade schools and high schools. Most of the revenue is provided by local taxation. Textbooks and school supplies are free, including those of the high schools. Attendance is compulsory from eight to fourteen years.

State normal schools are maintained at Plymouth and Keene, and the state agricultural college is at Durham. Dartmouth College at Hanover is the leading educational institution (See Dartmouth College), and St. Anselm's College at

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Manchester is a prominent Roman Catholic institution. Phillips Exeter Academy and St. Paul's at Concord are secondary schools of national reputation. In all there are 70 seminaries, academies and high schools within the state.

STATE INSTITUTIONS. The hospital for the insane is at Concord and the orphans' home is at Franklin. The school for the feeble-minded is at Laconia. There is an industrial school at Manchester and the state prison is at Concord.

CITIES. The chief cities are Concord, the capital; Manchester, Nashua, Portsmouth, Berlin, Dover, Rochester, Keene, Laconia, Somersworth and Franklin.

HISTORY. The territory between the Merrimac and the Sagadahoc was granted to John Mason and Ferdinando Gorges in 1622 under the designation of the Province of Maine. They divided this territory, Gorges taking the part on the east of the Piscataqua and Mason that on the west. Their titles were secured to them by new patents from the Council of Plymouth in 1629. The name New Hampshire first appears in the patent to John Mason, of this date. The first settlers came directly from England and located at Little Harbor, afterwards Portsmouth, in 1623; the Hiltons, also from England, located at Dover Neck later in the same year. Very likely some of the early settlers before 1629 came from Hampshire, England. John Wheelwright founded Exeter in 1638. Hampton was settled as a Massachusetts grant by Massachusetts immigrants in 1639.

In 1641 the towns along the Piscataqua and the coast formed a governmental union with Massachusetts Bay, and Exeter joined in 1643. The King dissolved this union in 1679 and established the Province of New Hampshire, which continued until 1686. The Dominion of New England, including the Province of New Hampshire and the Colonies, existed from 1686 to 1689. A second union of New Hampshire and Massachusetts existed from 1690 to 1692. In 1692 this union was dissolved and New Hampshire was thereafter an independent province, but from 1699 to 1741 it had the same governor as Massachusetts. New Hampshire men were engaged in all the important operations of the Revolution. The state adopted an independent but temporary constitution in 1776, and a permanent one in 1783. It ratified the Federal Constitution in 1788. In the Civil War it sent about 34,000 soldiers to the Union army. Consult F. B. Sanborn, *New Hampshire,* in the American Commonwealths Series.

GOVERNORS. Josiah Bartlett, 1793-1794; John Taylor Gilman, 1794-1805; John Langdon, 1805-1809; Jeremiah Smith, 1809-1810; John Langdon, 1810-1812; William Plumer, 1812-1813; John Taylor Gilman, 1813-1816; William Plumer, 1816-1819; Samuel Bell, 1819-1823; Levi Woodbury, 1823-1824; David Lawrence Morril, 1824-1827; Benjamin Pierce, 1827-1828; John Bell, 1828-1829; Benjamin Pierce, 1829-1830; Matthew Harvey, 1830-1831; Joseph Morrill Harper, 1831; Samuel Dinsmoor, 1831-1834; William Badger, 1834-1836; Isaac Hill, 1836-1839; John Page, 1839-1842; Henry Hubbard, 1842-1844; John Hardy Steele, 1844-1846; Anthony Colby, 1846-1847; Jared Warner Williams, 1847-1849; Samuel Dinsmoor, 1849-1852; Noah Martin, 1852-1854; Nathaniel Bradley Baker, 1854-1855; Ralph Metcalf, 1855-1857; William Haile, 1857-1859; Ichabod Goodwin, 1859-1861; Nathaniel Springer Berry, 1861-1863; Joseph Albree Gilmore, 1863-1865; Frederick Smyth, 1865-1867; Walter Harriman, 1867-1869; Onslow Stearns, 1869-1871; James Adams Weston, 1871-1872; Ezekiel Albert Straw, 1872-1874; James Adams Weston, 1874-1875; Person Colby Cheney, 1875-1877; Benjamin Franklin Prescott, 1877-1879; Natt Head, 1879-1881; Charles Henry Bell, 1881-1883; Samuel Whitney Hale, 1883-1885; Moody Currier, 1885-1887; Charles Henry Sawyer, 1887-1889; David Harvey Goodell, 1889-1891; Hiram Americus Tuttle, 1891-1893; John Butler Smith, 1893-1895; Charles Albert Busiel, 1895-1897; George Allen Ramsdell, 1897-1899; Frank West Rollins, 1899-1901; Chester Bradley Jordan.

1901-1903; Nahum Josiah Bachelder, 1903-1905; John McLane, 1905-1907; Charles M. Floyd, 1907-1909; Henry B. Quinby, 1909-1911; Robert P. Bass, 1911-1913; Samuel D. Felker, 1913-1915; R. H. Spaulding, 1915—. Before 1792, state governors were called presidents.

**New Ha'ven, Conn.,** the largest and most populous city of the state, county seat of New Haven Co., 36 m. n.w. of Hartford and 73 m. n.e. of New York, at the head of New Haven Bay, 4 m. from Long Island Sound, and on the New York, New Haven & Hartford and other railroads. There is also excellent interurban railway service. A number of steamship lines connect the city with New York and the various Sound ports, and aid in making New Haven a commercial and distributing center for a large section of the state. The city has an area of 23 sq. m. and is bordered on the east and west by the Quinnipiac and West rivers, which flow into the harbor. Near the city limits rise East Rock and West Rock, respectively 380 and 400 ft. in height, producing a very picturesque effect.

Parks and Boulevards. The streets of New Haven are broad and well kept and generally skirted with majestic elms, for which the city is noted and from which it has received the name of "The City of Elms." These elms were mostly set out about the close of the 18th century. "The Old Green" is a noted public square in the center of the city, about which the original settlers built their houses, and was for many years the public burial ground. The park system of New Haven comprises more than 1200 acres. Among the suburban pleasure resorts are East Rock Park with its driveways to the top, and crowned at its summit by a monument dedicated to the Connecticut soldiers and sailors of the Civil War; and West Rock Park with the famous Judge's Cave, the place of concealment of the regicides, Whalley and Goffe. Edgewood, Beaver Pond and a number of smaller parks are included within the limits of the city and add to its attractiveness.

Institutions. New Haven is the seat of Yale University, one of the foremost educational institutions of the country (See Yale University). It was chartered by the Colonial General Assembly of Connecticut as a collegiate school at Saybrook in 1701. In 1718, a year after the removal of the institution to New Haven, it was named in honor of Elihu Yale, an early patron who donated large gifts to the college. Other buildings and institutions include the state normal school, Boardman Manual Training School, Hopkins Grammar School, founded in 1660, Hillhouse High School, New Haven, St. Raphael's and Grace hospitals, and St. Francis and New Haven orphan asylums. The public library contains many thousands of volumes and there are also valuable collections belonging to the New Haven Colony Historical Society, American Oriental Society, the Young Men's Institute and the Connecticut Academy of Sciences.

Industries. New Haven ranks first among the industrial centers of the state. The city contains large railroad repair shops, and there are extensive manufactories, which include those making firearms, hardware, clocks, watches, wagons and carriages, ammunition, rubber goods, automobiles and supplies, corsets, paper boxes, cigars, candies, webbing, edge tools, wire goods, musical instruments, pulp and paper, boilers, engines and foundry products. The city has also slaughtering and packing industries. There is considerable commerce and coastwise trade.

History. In 1638 a company of Puritans led by Theophilus Eaton and Rev. John Davenport, who had arrived from England the year previous, made a permanent settlement at the place called Quinnipiac by the Indians, who sold them a large tract of land, receiving in return an assortment of hatchets, knives, spoons and coats. Treaties were signed by both parties. The colony was later known as the New Haven Colony, and Theophilus Eaton was the first governor, the Indian name Quinnipiac being

changed to New Haven after Newhaven, England. This independent colony united with the Connecticut Colony in 1665 under the charter of 1662. In 1701 New Haven was made joint capital of the state with Hartford until 1873, when Hartford became the sole capital. Steamboat connection was opened to New York in 1815, the *Fulton* being the first steamboat on Long Island Sound. The first railroad entered the town in 1838. Among the historic features of the city are several churches built early in the 19th century, and the old burying ground containing the graves of Noah Webster, Roger Sherman, Benjamin Silliman, Timothy Dwight, Eli Whitney, Samuel F. B. Morse, Theodore Winthrop and other distinguished men formerly identified with the city. New Haven was first incorporated as a city in 1784, new charters being secured in 1881 and 1889. Fairhaven was annexed to New Haven in 1897. Population in 1910, 133,605.

**New Hebrides,** *Heb' ri deez,* a chain of islands in the Pacific Ocean, lying n.w. of Australia. The total area is approximately 5000 sq. m. The principal islands are Espiritu Santo, Efate, Amboym, Aragh Aragh, Aoba, Maewo and Epi, or Tasiko. The fertile soil yields fruit in abundance, but the climate is unhealthful. The natives respond to civilization, and several of them have been christianized and are able to read and write. Population, about 50,000.

**New Ibe'ria, La.,** a city and the parish seat of Iberia Parish, about 125 m. w. of New Orleans, on the Bayou Teche, at the head of navigation, and on the Southern Pacific and other railroads. The leading manufactories include knitting mills, shipyards, foundries, machine shops and manufactories of cottonseed products, cypress lumber, cypress cisterns and tanks, sash, doors and blinds, wagons, carts, common and pressed brick, soap and tobasco sauce. On Avery's Island, in the near vicinity, there are valuable deposits of salt. New Iberia is in a section made famous as the scene of a part of Longfellow's *Evangeline.* Within the city are several features of interest, including a Federal post office, fine city hall, large public market and a public library. Population in 1910, 7499.

**New Jersey,** *Jur' zy,* THE GARDEN STATE, one of the South Atlantic States, is bounded on the n. by New York, on the e. by the Atlantic Ocean, on the s. by Delaware Bay and on the w. by Delaware and Pennsylvania. The Delaware River forms the entire western boundary line.

SIZE. The greatest length from north to south is 166 m., the average width is 50 m. and the area is 8224 sq. m., of which 710 sq. m. are water. New Jersey is about twice the size of Connecticut and a little larger than Lake Ontario. It is about one-fourth the size of Maine and is the 45th state in the Union in area.

POPULATION. In 1910 the population was 2,537,167. From 1900 to 1910 there was a gain in population of 653,498, or 34.7 per cent. There are 337.7 inhabitants to the square mile and the state's rank in population is 11.

SURFACE. According to surface, New Jersey is divided into four divisions, known respectively as the Appalachian Mountains and Valley, the Highland Belt, the Piedmont Plain and the Coastal Plain. The Appalachian region includes the Kittatinny Mountains and Valley and occupies the northwestern portion of the state. The Kittatinny range is low, nowhere exceeding 1800 ft. in altitude. The range is rocky and rugged and is heavily wooded. The famous Delaware Water Gap is formed by that river's cutting its way through these mountains. The Kittatinny Valley to the southeast of these ranges is from 10 to 13 m. wide and lies between the Kittatinny range and the highlands. It contains high, rolling hills, including smaller valleys, and is a beautiful and highly developed farming section.

The Highland Belt crosses the state from southwest to northeast. It consists of several parallel ridges from 1200 to 1400 ft. high, and separated by long, narrow valleys which are occupied by

farms. The ridges are nearly uniform in height and in the north include several lakes.

The Piedmont Plain lies to the southeast of the highlands and is nearly as large as the two other divisions combined. It contains a number of ridges formed by the outcropping of trap rock, the most remarkable being those known as the Palisades (See PALISADES). South of the Piedmont Plain and occupying the agricultural part of the state is the Coastal Plain. This is characterized by hills having gentle slopes and with a general trend toward the Atlantic and Delaware Bay. Navesink Highlands and Mt. Pleasant Hills are the highest elevations in this division.

RIVERS AND LAKES. The rivers are short and small. The western part of the state is drained into Delaware Bay. The Passaic, Hackensack and Raritan, flowing into Newark Bay, are the most important streams. The rivers in the southern part of the state are characterized by large estuaries which enter the Atlantic.

There are a number of mountain lakes in the northern part of the state, the most important being Hopatcong, Greenwood, Splitrock, Macopin, Wawayanda, Green and Budd's.

CLIMATE. The winters are mild and the summer heat is tempered by sea breezes, so that the state has a mild, temperate climate. The annual rainfall is about 49 inches and the mean temperature is 49° in the highlands and 53° along the coast.

MINERALS AND MINING. Iron ore occurs in the northern part of the state and there are a number of mines from which magnetic ore is taken. While the quantity is not large, relatively, the output of these mines is important because of the use made of the ore in the production of steel. There are important zinc mines in Sussex County, and New Jersey is the second zinc-producing state in the Union. Fire clay and clay suitable for pottery and terra cotta and brick occur in large quantities along the Raritan River, and along the Delaware and Hackensack. Granite, gneiss, sandstone, slate and other building stones are quarried, and there are large deposits of rock in Warren County suitable for the manufacture of cement.

AGRICULTURE. Most of the land except that covered by forests is suitable for agriculture. The farms are small, averaging about 82 acres, and intensive farming is generally practiced.

*Soil.* The soil is generally fertile, though of different varieties in the different parts of the state, thus giving opportunity for a great variety of crops.

*Products.* Apples and peaches are raised in large quantities in the northern part of the state and pears in the central part, though these fruits are found in all counties. The southern section is known for its strawberries, raspberries and blackberries. Cranberries grow profusely in the swamp lands, and large areas are covered with native huckleberries. Grapes, currants and cherries are also extensively cultivated. The proximity of New Jersey to New York, Philadelphia and Baltimore makes this state an ideal location for truck farming, and large areas are devoted to this industry, tomatoes, melons and garden vegetables being produced in great quantities.

The leading cereal crops are corn, oats, rye and wheat. New Jersey is known for the excellent quality of its sweet potatoes, and large quantities are shipped to the Northern markets every year. Dairying is practiced to a considerable extent, and near New York raising flowers for market is a thriving industry.

FISHERIES. The coast waters around the mouth of the Raritan River and Delaware Bay contain large oyster beds, and other beds are found in the Maurice River. The income from the oyster fisheries is about $2,275,000 a year. Clams, shad, sturgeon and other fish are also taken in paying quantities.

MANUFACTURES. The chief manufacturing centers are around New York and Philadelphia. New Jersey leads in the manufacture of silk and is second in the manufacture of pottery. Leather,

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jewelry, woolen goods, chemicals in great variety, rubber goods, machinery and locomotives are manufactured to meet the demands of an extensive market. Camden is known for its shipbuilding and Elizabeth for the manufacture of sewing machines. Bricks and terra cotta are made about Perth Amboy, and some glass is made in the southern part of the state. Considering its area and population, New Jersey ranks as one of the leading manufacturing states.

TRANSPORTATION AND COMMERCE. The state contains over 2300 m. of railroad and over 1200 m. of electric lines. The principal railroad systems are the Pennsylvania, the West Jersey & Sea Shore, the Central Railroad of New Jersey, the Delaware, Lackawanna & Western, the Philadelphia & Reading and the Lehigh Valley. There are a number of other companies operating lines within the state. The great railroad centers are at Jersey City and other points opposite New York, where many trunk lines have their Eastern terminals. The state is well supplied with railways and every locality has quick and frequent transportation for its products. The docks opposite New York practically form a part of New York Harbor, and in them are found ships from all parts of the world. The Delaware and Raritan Canal connects Jersey City with Phillipsburg, thence with the canal system of Pennsylvania.

The trade between the farms of New Jersey and the markets of New York and Philadelphia and other cities is extensive. A considerable part of the foreign trade of New York City is carried through Jersey City, so that the state as a whole has a more extensive commerce than any other state of the same population.

The shores of New Jersey are especially attractive. These, combined with the salubrious climate, have been the means of the upbuilding of a number of seaside resorts. Some of these have for many years enjoyed a national reputation. Among them are Cape May, Asbury Park and Atlantic City. Prosperous resorts are found among the mountainous lakes in the northern part of the state. The most important of these are at Budd's, Hopatcong and Greenwood lakes.

GOVERNMENT. The present constitution was adopted in 1844 and revised in 1875. The governor is elected by popular vote for three years. The state treasurer and comptroller are chosen for three years at a joint session of the two houses of the Legislature. The governor with the approval of the Senate appoints the secretary of state, attorney-general, clerk of the Supreme Court, clerk of the Court of Chancery, superintendent of public instruction and keeper of the state prison. These appointments are for five years. The Legislature consists of a Senate of 21 members and a House of Representatives of 60 members. Senators are chosen for three years, representatives for one year.

The judicial department consists of law courts and courts of equity consisting of a Supreme Court, Court of Errors and Appeals, Court of Chancery, Circuit Courts, Prerogative Court, Impeachment Court, Court of Pardons and inferior courts. The chancellor and judge of the Supreme Court are appointed by the governor for a term of seven years.

EDUCATION. The public schools are managed by a state board of education appointed by the governor and confirmed by the Senate for five years. The secretary of this board exercises the duties and powers of a state superintendent of public instruction. The board of education appoints a county superintendent for each county. All cities and towns maintain excellent systems of graded schools, and kindergarten courses and manual-training schools are common. State normal schools are maintained at Trenton and Upper Montclair. The state agricultural school is connected with Rutgers College at New Brunswick.

The higher educational institutions not under control of the state are: Princeton University at Princeton; Stevens Institute of Technology at Hoboken; Seton

Hall College at South Orange; Centenary Collegiate at Hackettstown; Blair Presbyterian Academy at Blairstown; Pennington Seminary at Pennington; Lawrenceville School at Lawrenceville; Peddie Institute at Hightstown; Drew Theological Seminary at Madison.

STATE INSTITUTIONS. The hospitals for the insane are at Trenton and Morristown. There is a village for epileptics at Skillman and there are homes for feeble-minded women and children at Vineland. The school for the deaf is at Trenton, the state prison is at Trenton and the reformatory is at Rahway. There is a home for boys at Jamesburg and one for girls at Trenton. A soldiers' home is at Kearny, and there is a home for disabled soldiers, sailors, marines and their wives at Vineland.

CITIES. The chief cities are Trenton, the capital; Jersey City, Camden, Elizabeth, Hoboken, Newark, New Brunswick, Paterson and Orange.

HISTORY. New Jersey was named to commemorate the defense of the Isle of Jersey, in the English Channel, by Carteret. The first party of permanent homeseekers (Hollanders) in 1623 built Ft. Nassau (Gloucester). Later came Swedes and English. These three peoples fought continuously for supreme control till, in 1664, Charles II granted to the Duke of York the land from Cape May to Nantucket. Given, in turn, to lords Berkeley and Carteret, they divided it into East and West Jersey. In 1674 West Jersey was bought by a syndicate of Quakers, and in 1682 Quakers bought East Jersey. In 1702, however, the two sections were reunited. In the Revolution, for which it furnished over 10,000 men, New Jersey was the scene of important action. Later it fought against a strong central government; yet it early ratified the Federal Constitution. Universal suffrage was practiced from 1776 to 1807. Slavery was an institution till 1820. After that it was gradually abolished. For the Union army about 90,000 men were furnished. Since the Civil War, taxation and the control of corporations have been important issues. Consult Lee's *New Jersey as a Colony and as a State.*

GOVERNORS. William Livingston, 1776-1790; William Paterson, 1790-1793; Richard Howell, 1793-1801; Joseph Bloomfield, 1801-1802; John Lambert, 1802-1803; Joseph Bloomfield, 1803-1812; Aaron Ogden, 1812-1813; William Sandford Pennington, 1813-1815; Mahlon Dickerson, 1815-1817; Isaac Halsted Williamson, 1817-1829; Garret Dorset Wall, 1829; Peter Dumont Vroom, 1829-1832; Samuel Lewis Southard, 1832-1833; Elias P. Seeley, 1833; Peter Dumont Vroom, 1833-1836; Philemon Dickinson, 1836-1837; William Pennington, 1837-1843; Daniel Haines, 1843-1844; Charles C. Stratton, 1845-1848; Daniel Haines, 1848-1851; George Franklin Fort, 1851-1854; Rodman McCauley Price, 1854-1857; William Augustus Newell, 1857-1860; Charles Smith Olden, 1860-1863; Joel Parker, 1863-1866; Marcus Lawrence Ward, 1866-1869; Theodore Frelinghuysen Randolph, 1869-1872; Joel Parker, 1872-1875; Joseph Dorsett Bedle, 1875-1878; George Brinton McClellan, 1878-1881; George Craig Ludlow, 1881-1884; Leon Abbett, 1884-1887; Robert Stockton Green, 1887-1890; Leon Abbett, 1890-1893; George Theodore Werts, 1893-1896; John William Griggs, 1896-1898; Foster MacGowan Voorhees, 1898; David O. Watkins, 1898-1899; Foster MacGowan Voorhees, 1899-1902; Franklin Murphy, 1902-1905; Edward Casper Stokes, 1905-1908; John Franklin Fort, 1908-1911; Woodrow Wilson, 1911-1913; James F. Fielder, 1914—. Governors are not eligible for immediate reelection.

**New London, Conn.,** port of entry and one of the county seats of New London Co., 51 m. e. of New Haven and 13 m. s. of Norwich, the other county seat, on the Thames River, 3 m. from its entrance into Long Island Sound, and on the New York, New Haven & Hartford and the Central Vermont railroads. It has regular steamer connection with New York and all the Sound ports. The harbor is one of the best in the United States and is defended by forts Gris-

wold and Trumbull. Above the city on the east side of the river is a United States naval station. New London is delightfully situated and is a popular summer resort. It had formerly a large whaling and sealing trade which is still of considerable importance. It is also a distributing center for a large amount of the imports used in the southeastern part of the state.

The manufacturing interests of New London are represented by silk, woolen and sewing-silk mills, foundries, oil refineries, machine shops, a cotton-gin factory, bed-quilt mills, printing-press works and a furniture factory. Shipbuilding is an important industry. The annual Yale-Harvard boat race is rowed on the Thames. Among the historic places of interest are the Hempstead House, one of the oldest houses in Connecticut; the little schoolhouse where Nathan Hale was once a teacher; and the Old Town Mill, built in 1646. The city is the seat of the New London County Historical Society and Library.

New London was founded in 1646 by John Winthrop, the younger, and was known by the Indian name of Naumeag. In 1658 the name was changed to New London. Prior to the Revolution it had established trade with the near-by colonies and the West Indies. On Sept. 6, 1781, Benedict Arnold, at the head of a large British force, attacked New London, destroyed the wharves and many of the buildings and killed a number of the people. A shaft 127 ft. high has been erected at the place where the massacre occurred. The town was incorporated in 1784. Population in 1910, 19,659.

**New Mad'rid, Battle of.** See ISLAND NUMBER 10.

**New'man, John Henry** (1801-1890), a Roman Catholic prelate, born in London. At the age of 16 he entered Trinity College, Oxford, received his degree there in 1821 and was elected a fellow of Oriel College in 1822. Two years later he was ordained curate of St. Clement's Church, Oxford, the following year being vice-principal of St. Alban's Hall and in 1826 tutor in Oriel. Two years later he became vicar of St. Mary's. He traveled in southern Europe during 1832-33, and on his return became associated with Keble and Pusey in the Oxford Movement (See OXFORD MOVEMENT). Newman at this time advocated the need of a visible head of the Church and of sacraments and rites, and declared that the Roman Catholic Church and the Papacy were contrary to the teachings of Christianity. He propagated these ideas through *Tracts for the Times.* After a period of religious doubt and struggle, he retracted his attacks on Catholicism, and in 1845 joined the ranks of the Catholic Church. Leaving Oxford early in 1846, he spent a year in Rome, where he was ordained to the priesthood. In 1854 he became rector of the Roman Catholic University of Dublin, remaining here for four years. In 1878 he was elected honorary fellow of Trinity, having regained the esteem that he had lost when he deserted the Anglican Church. The following year Pope Leo XIII created him a cardinal. He continued to reside in England, and died in Birmingham.

Newman's literary masterpiece, a volume of lectures entitled *Idea of a University,* was the outcome of his residence in Dublin. His religious autobiography, *Apologia pro Vita Sua,* won for him the high regard of entire England. *The Dream of Gerontius* deals with a soul's yearning for truth. Best loved of all his verse is the noble hymn, *Lead, Kindly Light.* Newman's mind was lofty and sweet, and his prose style, at its best, was more nearly perfect than that of any other English writer of his time, being pure, melodious and beautifully clear.

**New Mex'ico,** one of the Mountain States, is bounded on the n. by Colorado, on the e. by Oklahoma and Texas, on the s. by Texas and Mexico and on the w. by Arizona.

SIZE. Its length from north to south is 400 m., and its width from east to west is 358 m. The total area is 122,634 sq. m., of which 131 sq. m. are water. New Mexico is about three times the size of Ohio, a little less than Utah and Virginia combined and the fourth state in area.

Population. The population in 1910 was 327,301. The decade from 1900 to 1910 showed an increase of 131,991, or 67.5 per cent. There are 2.7 inhabitants to the square mile and the state's rank in population is 44.

Surface. The altitude of the state as a whole is high, no part of it being below 3000 ft. The Rocky Mountains enter the state from the north, and the Sangre de Cristo, the main range east of the Rio Grande, extends as far as Santa Fe, which has an altitude of 7000 ft. East of the Sangre de Cristo there are several minor ranges, but the general slope is towards the east and south. In the southeastern part of the state is an arid table-land known as the Llano Estacado, or Staked Plains. West of the Pecos River and south of the center of the state is a group of mountain ranges, among which the Sacramento Mountains and the Guadalupe Mountains are the most prominent, but all are lower than the main ranges of the Rocky Mountains in the north. The Rio Grande divides New Mexico into two unequal divisions by a narrow valley extending across the state from north to south. The portion west of this valley consists of a high plateau extending southward to the Gila River. Throughout the plateau are evidences of former intense volcanic activity, and near its southern boundary are numerous extinct volcanoes and lava beds. Mt. Taylor (11,389 ft.), in the northern part of Valencia County, is surrounded by some of the most wonderful volcanic buttes in the world. In the south-central part of the state east of the Rio Grande is the basin of a former lake, in which are numerous dunes of so-called white sand, but which are formed of almost pure granular gypsum. A distinctive feature of New Mexican scenery is the mesa, or flat-topped bluff. On some of these, Indian pueblos are still found.

Rivers. The Rio Grande is the largest river. Passing through the center of the state, it receives several unimportant tributaries, such as the Chama, Jemez and Rio Puerco, and crosses the New Mexican line a little west of the center of the southern boundary. Other important rivers are the Pecos, draining the southeastern part; the Canadian, carrying the waters of the eastern slope of the Rocky Mountains; and the westward-flowing rivers, the San Juan, the Rio San Francisco, the Gila and the Rio Puerco of the West. Despite deficient rainfall the streams of New Mexico are unusually numerous, though one characteristic of them is that they often run totally dry, either by evaporation or as a result of broken stratification.

Climate. The climate is very healthful, due to the southern latitude, the low degree of humidity and the lofty elevation, and the state has grown famous as a health resort, especially for those afflicted with pulmonary disorders. Although the heat sometimes is oppressive during the summer months, the nights are always cool. The mean temperature of the different sections varies from about 42.4° to 65°. The rainfall is heaviest between May and August, and averages between 15 and 17 inches; as a result of deficient precipitation, irrigation is necessary.

Minerals and Mining. The Spaniards and Mexicans were aware of the existence of valuable mineral deposits in the state, but little silver mining was carried on until 1881, when the Lake Valley mines were first worked. Gold, copper and zinc deposits are found, principally in the counties of the southwest. Lead is produced in small amounts in connection with the zinc industry. Coal in all forms, from lignite to anthracite, is by far the most important mineral product, and is deposited in widely distributed areas. Other minerals are salt, gypsum (of which there is practically an inexhaustible supply, as yet unworked), clay, soda, potash, ocher, marble, mica, tungsten and iron. Among precious stones are turquoises, opals, garnets and chalcedony.

Forests. The timber lands cover the slopes of several of the mountain ranges, chiefly in the western part. The principal trees are pine, oak, birch, cedar, maple, juniper and piñon. Many of the

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forest areas are now government reservations. In the southern and southeastern counties is the huge cactus, or saguaro; also groves of walnut and oak. Along the rivers are cottonwoods and a few sycamores and willows.

AGRICULTURE. Raising live stock is the most important branch of agriculture, and large numbers of horses, cattle, sheep and swine are shipped each year. New Mexico is also one of the leading wool-producing states. In some regions dry-farming is very successful, and in 1912 over 2,000,000 acres were under tillage by this method. In the river valleys and the irrigated districts a great variety of crops, including alfalfa, sugar beets, garden vegetables and fruits may be found. The completion of large government reclamation projects from year to year is continually increasing the acreage open to irrigation. The chief field crops are hay, corn, wheat, oats, barley and potatoes. Sugar beets have been introduced and cantaloupes, cabbages, onions, cauliflowers and turnips are grown. In the irrigated districts grapes, apples, pears, quinces, plums and apricots, all of excellent quality, are found.

MANUFACTURES. The manufacturing industries of New Mexico have not been developed to any great extent. They are represented by the construction of railway cars and general shop and repair work, the manufacture of flour and gristmill products, wool-scouring plants for the production of wool, the manufacture of timber and lumber products and the printing and publishing of newspapers and periodicals. There are also plants for the smelting and refining of ore, several establishments for canning fruit, beet-sugar factories and distilleries.

TRANSPORTATION. The railway mileage exceeds 3000 and is increasing from year to year. The main trunk lines are the Santa Fe and the Southern Pacific. The former crosses the northern boundary some distance east of the central point and extends in a southwesterly direction to Albuquerque, thence westward into Arizona. The Southern Pacific enters the state at El Paso and extends westward across the southern part. The Rock Island extends in a southwesterly direction from about the center of the eastern boundary to El Paso, thence westward to Benson, Ariz., where it forms a junction with the Southern Pacific. From Santa Rosa to Benson the line is known as the El Paso & Southwestern. Each of these systems has short lines extending to different parts of the state.

GOVERNMENT. The present constitution was adopted in 1911, and has been twice amended. The executive officers, who are elected for four years, are a governor, lieutenant-governor, secretary of state, state auditor, state treasurer, attorney-general, superintendent of public instruction and commissioner of public lands. The Legislature consists of a Senate and a House of Representatives. The Senate has 24 members, elected for four years; the House, 49 members, elected for two years. The judicial department is made up of a Supreme Court of three justices, elected for eight years; eight District Courts, with one judge to each district, elected for six years; and Probate Courts in each county. The constitution provides for a state corporation commission of three members, elected for six years. This commission charters and regulates corporations other than municipal, and is empowered to fix rates of public service charges.

EDUCATION. The illiteracy which was common among the inhabitants of New Mexico who were of Spanish descent, is gradually disappearing through the establishment of schools, the increased length of their terms and a general improvement of the public school system. The law now requires the use of English in the schoolroom. There is a board of education at the head of the system, a state superintendent, local boards in the incorporated cities, a superintendent of schools for each county and three directors of each school district into which the country is divided. The University of New Mexico is at Albuquerque. Other institutions are the college of agriculture and mechanic arts at Mesilla Park, a

normal school at Silver City, a normal university at Las Vegas, a military institute at Roswell and a school of mines at Socorro. Indian training schools are maintained by the government, and religious denominations and missions also support several schools.

State Institutions. There is an asylum for the insane at Las Vegas, an institute for the blind at Alamogordo, a penitentiary and an asylum for the deaf and dumb at Santa Fe, a miners' hospital at Raton and a reform school at Springer. Private hospitals and charitable institutions have also received appropriations from the State Legislature. The government sanatoriums at Ft. Stanton and Ft. Bayard are especially for sailors and soldiers afflicted with pulmonary tuberculosis.

Cities. The important cities are Santa Fe, the capital; Albuquerque, Las Vegas, Raton, Roswell, Deming, Las Cruces and Tucumcari.

History. There are traces of early inhabitation of New Mexico by sedentary and nomadic Indian tribes, and in 1537 the Spanish explorers reached the territory, which they named New Mexico in 1581. During the 17th century there were frequent revolts by the Indians against Spanish authority. In 1821 Mexico overthrew the Spanish power, and New Mexico was made a province of the former. It became a territory in 1824 and a department in 1836. New Mexico was ceded to the United States in 1848 by the Treaty of Guadalupe Hidalgo. The territory was organized in 1850; frequent changes in its boundaries were made later. Attempts to secure statehood were begun as early as 1850. Arizona opposed the bill passed by Congress in 1906, which provided for the admission of New Mexico and Arizona as one state, and the status of the territory remained unchanged until 1910. In that year the enabling act providing for the admission of New Mexico as a state was approved by Congress, and in August, 1911, the resolution to admit the state was approved. Consult H. H. Bancroft's *Arizona and New Mexico.*

Governors. (Under the United States.) James S. Calhoun, 1851-1852; Edwin V. Sumner, U. S. A. Commandant, 1852; John Greiner, 1852; William C. Lane, 1852-1853; David Merriwether, 1853-1857; Abraham Rencher, 1857-1861; Henry Connelly, 1861-1865; W. E. M. Arny, 1865-1866; Robert B. Mitchell, 1866-1869; William A. Pile, 1869-1871; Marsh Gidding, 1871-1875; William G. Ritch, 1875; Samuel B. Axtell, 1875-1878; Lewis Wallace, 1878-1881; Lionel A. Sheldon, 1881-1885; Edmund G. Ross, 1885-1889; L. Bradford Prince, 1889-1893; William T. Thornton, 1893-1897; Miguel A. Otero, 1897-1906; Herbert J. Hagerman, 1906-1907; J. W. Reynolds, 1907; George Curry, 1907-1909; William J. Mills, 1909-1912; William C. McDonald, 1912—. William C. McDonald, the first state governor, was inaugurated Jan. 15, 1912.

**New Mexico, University of,** at Albuquerque (1889). Preparatory, normal and collegiate departments were opened in 1892. Schools of commercial work, science, music and art have since been added. The Hadley Climatological Laboratory is connected with the university and is investigating particularly the climatic influence of the dry plateau regions upon health. The university has been endowed by the grant of 243,000 acres of public and 150,000 acres of saline lands. The enrollment is proportional to the population of the state and is increasing from year to year.

**New Orleans,** *Or' le anz,* **La.,** a seaport, county seat of Orleans Parish and metropolis of the South, on the east bank of the Mississippi River, 107 m. from the end of South Pass Jetties, on the Gulf of Mexico, 141 m. s.w. of Mobile, and on the Southern Pacific, the Louisville & Nashville, the Texas & Pacific, the Illinois Central, the St. Louis & San Francisco, the New Orleans & Northeastern, the Southern, the Yazoo & Mississippi Valley, the Shreveport & Red River Valley and other railroads. Deep-sea shipping reaches New Orleans through the mouth of the Mississippi River. The port, which is noteworthy

for its public ownership, extends through the Parish of Orleans and parishes of Jefferson and St. Bernard for 17 m. on the east bank and 22 m. on the west bank of the Mississippi River. Many lines of steamers give direct connection with all European ports, Central America, Havana, Tampa, Porto Rico, Panama and the Orient, and coastwise service to Atlantic coast ports. There is also large steamer traffic to all parts of the Mississippi Valley. The Carondelet and New canals give access to Lake Ponchartrain, a lake 40 m. long and 20 m. wide, about 3 m. northwest of the city. The total area of New Orleans is 196 sq. m. within the municipal limits, but the city proper covers about 40 sq. m. The city contains over 210 m. of street railways.

New Orleans is one of the largest cotton ports in America, and is the principal center of the country for the manufacture of cottonseed products and for rice and coffee milling and molasses and sugar refining. It is also a manufacturing city of no mean importance. The city is now known as a modern New Orleans. A great drainage system with underground canals has been constructed to carry off the surface water from the city to Lake Borgne. A modern sewerage system has also been installed, and the new waterworks plant is one of the best in the country. The cost of the waterworks and filtration plant was about $7,000,000.

Parks and Boulevards. The site of the city is on a level plain only 10 ft. above sea level. The lower parts of the city are about 10 ft. below the river at high-water mark, but are protected by levees. The central thoroughfare and shopping center is Canal Street, which divides the old French district from the newer parts of the city. All street-car lines center here. The original city was bounded by the river and Rampart, Canal and Esplanade streets. St. Charles Avenue, Audubon Place and Prytania Street are among the handsome residential streets. The memory of French and Spanish dominion is retained in the names of many of the streets, which are wide and profusely shaded with tropical plants and flowers. City Park of 216 acres lies between the city and Lake Ponchartrain; Audubon Park, once a sugar plantation, was purchased by the city in 1871. In 1884 the Cotton Centennial Exposition was held on this site. Jackson Square is still known by its older name of the Place d'Armes and is associated with nearly all important events in the colonial history of Louisiana.

On the farther side of Lake Ponchartrain, adjacent to the city, are the lake and coast resorts; the towns of Covington, Abita Springs and Mandeville are located in what is known as the "Ozone Belt." The cemeteries include St. Louis No. 1, St. Roch's Campo Santo, Metairie and Greenwood. There is also a National cemetery at Chalmette, a few miles from the city, in which 12,000 Union soldiers of the Civil War are buried.

Public Buildings. Among the imposing and historical buildings are the city hall, built in the style of an Ionic temple; new courthouse; the Cotton Exchange; the Louisiana Sugar Exchange; the Produce Exchange; the Hennen, the Maison Blanche and the Tulane Newcomb buildings; the United States Immigrant Station, finished in 1913; the St. Charles Hotel, the third of the name on the same site; the De Soto Hotel; the post office; and the Customs House, renowned for its "marble room." The cornerstone of this building was laid by Henry Clay in 1847. The history and romance of New Orleans are united in the French Quarter of the city. The Cabildo, or government house, was named from the council that sat here during Spanish rule and was built in 1795. The French Market is also one of the interesting sights of the city. St. Louis Cathedral, first built in 1718, St. Patrick's and the First Presbyterian are among the many handsome churches of the city. The famous Mardi Gras, held in February each year, is the most elaborate carnival celebration in the world.

Institutions. Among the higher institutions of learning in the city are Tulane University (See Tulane Uni-

VERSITY OF LOUISIANA), College of the Immaculate Conception (Jesuit), Loyola College, Newcomb College and New Ursuline School. Among the higher schools for negroes are Leland University (Baptist), Straight University (Congregational), New Orleans University (Methodist) and Southern University, the last supported by the state. About 30 of the 112 public school buildings were a bequest of John McDonogh, whose life was intimately connected with that of the city. The libraries include a Carnegie library, Howard Memorial, the Athenée Louisiannaise and the Union Franchaise. There are also a state museum and Delgado Art Museum. The benevolent and charitable institutions include a large charity hospital and Milliken Memorial Hospital for children, which are supported by the state; homes for the aged; various asylums; orphans' homes; Soldiers' Home of Louisiana for Confederate veterans; St. Vincent's Home for Protestant widows; and Kingsley House, which is modeled after Hull House in Chicago.

INDUSTRY AND COMMERCE. The largest industry is sugar refining. The total capacity of the several sugar-refining plants is about 24,000 barrels per day. The oyster beds and fisheries of Louisiana represent one of the state's richest resources. Among other leading manufactories are molasses refineries, canneries, coffee roasters, burlap-bag factories, alcohol distilleries, shoe factories, lumber and shingle mills and manufactories of lard compound, cottonseed oil, furniture, refrigerators, boilers, drugs, boats, acids, cigars, mahogany veneer, extracts, brass goods, art pottery, galvanized tanks and paint. New Orleans is an extensive banana market, and in recent times the city has become a great petroleum-oil market. There are large car shops and general construction plants.

HISTORY. In 1718 the city was founded by Jean Baptiste Le Moyne, Sieur de Bienville, then governor of Louisiana, and named in honor of the Regent of France. In 1722 New Orleans was made the capital of the Louisiana Province. On Nov. 30, 1803, occurred the transfer of Louisiana to France. Twenty days later the keys of the city were again transferred to United States commissioners, and American rule was begun. During the Civil War, New Orleans suffered severely, but after the Reconstruction Period the city had a rapid growth. New Orleans has the commission form of government. Population in 1910, 339,075.

**New Orleans, Battle of.** This was the last battle of the War of 1812, fought Jan. 8, 1815, between Americans, under Gen. Andrew Jackson, and British, under Sir Edward Pakenham. The latter, one of Wellington's Peninsular commanders, had just come from Europe with 20,000 men, all of whom had served under Wellington or Nelson. Cooperating with him was a fleet of 50 ships, carrying more than 1000 guns. After delaying for about a month, during which time he misled the Americans as to his purpose, Pakenham advanced upon New Orleans. This position was defended by Jackson, who, with a motley army of volunteers, backwoodsmen and regulars, had at the last moment thrown up a breastwork of earth, boxes and cotton bales. In less than half an hour after the 12,000 British had made the assault, under cover of a dense fog, they were twice driven back, their loss including 2500 men, among whom were Pakenham and many other officers. The Americans lost about 70. Unfortunately, this battle, the most severe of the war, occurred two weeks after the treaty had been signed at Ghent, December, 1814; but news of peace did not reach the United States until February.

**New Philadelphia,** *Fil" a del' fi a,* **Ohio,** a city and county seat of Tuscarawas Co., 24 m. s. of Massillon and 100 m. s. of Cleveland, on the Tuscarawas River, the Ohio Canal and the Pennsylvania and the Baltimore & Ohio railroads. It is situated in a farming region but its excellent water power and shipping facilities have contributed largely in making it a manufacturing city. New Philadelphia has mining interests of coal

and iron and manufactories of woolen goods, canned goods, roofing tile, flour, stamped, pressed and enameled goods, brooms, carriages, steel products and ironware. Schoenbrun Springs and Riverside Park are attractive places of interest. The town was settled in 1805 and incorporated in 1808. Population in 1910, 8542.

**New'port, Ky.,** a city of Campbell Co., at the junction of the Ohio and Licking rivers, opposite Cincinnati, Ohio, and opposite Covington, Ky., on the Chesapeake & Ohio and the Louisville & Nashville railroads. The city is a popular residential suburb of Cincinnati and Covington. Electric railways connect with Bellevue, Dayton and Ft. Thomas, the last named being a United States military post, about three miles from the city. This post was established in 1888 to supersede the Newport Barracks, which were located in the city limits. Newport is attractively situated with wide and well-paved streets and numerous handsome residences. Industrially the city is important and ranks high among the manufacturing centers of the state. It contains large rolling and flour mills, brass and iron foundries and manufactories of cast-iron pipes, carriage supplies, watchcases, sheet iron, cigar-box material, steel rails and distilled liquors. Among the most noteworthy buildings are the courthouse, city hall, fine banks and numerous handsome churches. Newport was settled in 1791 and incorporated as a town in 1795. A city charter was granted in 1834. Population in 1910, 30,309.

**Newport, R. I.,** a city, port of entry and county seat of Newport Co., 30 m. s. of Providence and 70 m. s.w. of Boston, on the southwestern portion of the Island of Rhode Island at the entrance to Narragansett Bay, and on the New York, New Haven & Hartford, the Newport & Wickford and other railroads. It has also regular steamer connection with Providence, Fall River and New York. The shelter of Newport Harbor has been known to mariners the world over for 150 years. The harbor is deep enough for the largest vessels and is defended by Ft. Greble and Ft. Adams, the latter a fortress of great strength. Ft. Walcott, which has a United States torpedo station and torpedo factory, is located on Goat Island. Coasters Harbor Island, farther north, has an important United States naval station and a war college.

Newport enjoys the distinction of being one of the best-known summer resorts in the country. Its balmy atmosphere, varied scenery and splendid facilities for bathing and boating have made it one of the most fashionable and favorite resorts for pleasure seekers in the land. The old part of the town has narrow streets and quaint buildings near the harbor which recall the early days of the colony. Many wealthy citizens of New York, Philadelphia, Boston and other large cities have erected cottages and palatial homes, which are almost unsurpassed in the luxury of their appointments. These magnificient mansions are located on Cliff Walk, which follows the brow of the cliffs for three miles along the famous 12-mile Ocean Drive. The parks add attractiveness to the thoroughfares. One of these, Touro Park, is embellished by bronze statues of William Ellery Channing and Matthew Perry. Another park, the Parade, forms a handsome approach to the old State House, in which is a statue of Oliver H. Perry, who won the Battle of Lake Erie. Largest of all the parks is Morton Park, the gift of Levi P. Morton, by whose name it is known.

Newport contains many fine public buildings. The Newport Hospital is one of the best-equipped institutions in New England. St. George's School for boys is located about a mile east of Easton's Beach. Newport is also the seat of the Townsend Industrial School. Among the historical points of interest are the Vernon House, used by Count Rochambeau as his headquarters during the Revolutionary War; the Touro Synagogue, the first church erected by the Hebrews of America; the Sayer House, used as headquarters by Prescott, the British

general; and the Redwood Library. The commerce and industries are not extensive. Newport has, however, a valuable coastwise trade in fish, coal and general merchandise.

Newport was settled in 1639. Most of the founders are commemorated by place names in the city and vicinity. During the Revolution the British held the town from December, 1776, to October, 1779, and in 1778 it was besieged by D'Estaing in command of a French fleet. It was chartered as a city in 1784 and rechartered in 1853. Until 1900, when Providence became the sole capital, Newport was one of the seats of government of the state. Population in 1910, 27,149.

**Newport News, Va.,** a city and port of entry of Warwick Co., 12 m. n.w. of Norfolk and 75 m. s.e. of Richmond, on the James River at Hampton Roads. It is the terminus of the Chesapeake & Ohio Railroad, has electric railway connection with Norfolk, Portsmouth and Old Point Comfort and is connected by river steamboat service with Richmond and Petersburg. It is a harbor for coast steamship lines touching the large ports of the North Atlantic seaboard; and is a port for foreign steamships plying between it and London, Liverpool, Dublin, Glasgow, Belfast, Hamburg, Rotterdam and other foreign ports. The city is an important commercial center with a large export trade. It ranks as the fourth city in the United States in the shipment of grain. There is a famous shipbuilding yard here, in which the United States battleships *Illinois, Kearsarge, Kentucky, Louisiana, Minnesota, Missouri* and *Virginia* were constructed, as have been numerous submarines, gunboats, cruisers, merchant vessels and other craft. There are large grain elevators in the town, and ironworks, a brewery, woodworking mills, lumber mills and manufactories of shoes, medicines, shirts, knit goods and ice. Coal wharves and dry docks are important industrial features. The first settlement was made here in 1621. The present city was begun in 1882 and was incorporated in 1896. It was named in honor of Christopher Newport and Sir William Newce. Population in 1910, 20,205.

**Newport, Siege of.** During the Revolution the British held the town from December, 1776, to October, 1779. They then destroyed some 480 houses and so crippled the shipping that the commercial position of Newport was never restored. Gen. John Sullivan, cooperating with D'Estaing and his French fleet, attempted to recover the place in the summer of 1778. While the fleet blockaded Narragansett Bay and bombarded the town, Sullivan, who held Providence, was to break down the land defenses with the help of Greene, Glover and Lafayette. Unfortunately the French had to put out to sea to meet Howe's fleet, which appeared at the crucial moment, but both fleets were disabled by a storm before a battle was ever begun. After being repaired in Boston, D'Estaing's vessel withdrew to the West Indies and operations about Newport ceased. Shortly following the evacuation of the British, Rochambeau arrived with a French army and remained in the town until almost the end of the war.

**New Rochelle,** *Ro shell',* **N. Y.,** a city of Westchester Co., 16 m. from the Grand Central Station, New York, on Long Island Sound and on the New York, New Haven & Hartford, the New York, Westchester & Boston and other railroads. The city is accessible by three steam and electric lines with seven conveniently located stations. New Rochelle has one of the finest harbors on the Sound on the picturesque Echo Bay. There are over 40 m. of well-lighted, paved and shaded streets. Trolley lines run to all near-by towns and cities and the various seaside resorts and beaches. The city is primarily a residential suburb of New York and contains many handsome residences and large estates. Hudson Park and City Park are spacious recreation parks. Travers Island, within the city limits, has the fine building of the New York Athletic Club. Among the prominent club buildings are the New Rochelle Yacht, on Harrison Island; the Rowing, the Wykagyl Golf,

the Huguenot Yacht and the tennis club buildings. Among the public buildings are the Masonic Temple, containing the public library; the Trust Company, the National City and other bank buildings and the Y. M. C. A. and Hebrew Association buildings. The churches of the city are adequate in number and imposing in architecture. The educational institutions include the College of New Rochelle, conducted by the Ursuline Order; St. Gabriel's School, under the auspices of St. Gabriel's Church; a high school, the Mayflower, Winyah, Trinity and Columbus schools and several parochial schools. The charitable and benevolent institutions include the Colburn Memorial Home for the aged and the New Rochelle Hospital.

The most important industry is the manufacture of druggists' scales. There is also a large printing and publishing plant. The first settlement was made in 1868, by Huguenot refugees from La Rochelle, France. New Rochelle was incorporated in 1847 and received a city charter in 1899. Population in 1910, 28,867.

**New Siberia Islands,** a group of islands in the Arctic Ocean north of Siberia, Government of Yakutsk. The three largest islands are Kotelnoi, New Siberia and Fadievskoi. New Siberia is about 75 m. long and 30 m. wide. It contains interesting fossil remains of the mammoth, the buffalo and the rhinoceros. The group is 9650 sq. m. in area.

**New South Wales,** one of the original states of the Australian Commonwealth, located in the western part between Queensland upon the north and Victoria upon the south. It reaches the ocean westward to South Australia, a distance of from 600 to 750 m. Its area is 310,367 sq. m., about the same as that of the three Pacific States, Washington, Oregon and California. The Macintyre River forms a part of its northern boundary, and the Murray a part of its southern. The country is mainly mountainous, being crossed by the Australian Alps, which, with its many projecting spurs, crosses the country from north to south at a distance of from 25 to 120 m. from the coast. In general, they are abrupt in their slopes and broken by deep gorges and canyons. Descending to the east is a fertile, well-watered tract, but on the west is a region of plateaus visited by successive droughts and floods until desert conditions prevail. The principal rivers of New South Wales are tributaries of the Murray and the Darling.

New South Wales has the vegetation characteristic of the continent. There are forests of the tall eucalyptus, of oak, pine, ash, cedar and poplar, and regions of thorny shrubs. Where the soil is under cultivation wheat, maize, barley, oats, arrowroot, sugar cane, vegetables, cotton and fruits are raised. Considerable trade in native gums, fibers and bark is carried on. The great industry of the country, however, is stock raising; and sheep, cattle, horses and pigs are pastured upon the grasses of the valleys. Wool, meats, hides, leather, tallow and live stock are exported. The mines yield gold, silver, antimony, copper, iron, tin, coal and some diamonds. The manufacturing industries are chiefly concerned with shipbuilding and machine constructing.

New South Wales became a British colony in 1788, when it was settled as a penal colony. In 1843 a legislative council was established. There are now a Parliament of two houses, and a governor appointed by the Crown. Fully one-third of the population resides in and about Sydney, the principal port and capital city. The population is 1,648,210, 4000 of whom are natives. See AUSTRALIA.

**Newspaper,** a printed paper issued periodically for publishing the news.

HISTORY. The Romans and Chinese from an early period had issues similar to the modern newspaper. During the time of the empire the Roman generals were required to send daily accounts of what took place in the army, to those under their command. These tablets, called *Acta Diurna* (daily doings), were posted where all could see them. Gradu-

ally their scope was extended to include the acts of the Senate, opinions of public speakers and accounts of trials, punishments, deaths and public sacrifices. The *Peking Gazette,* containing imperial rescripts and official news, has appeared regularly since the eighth century A. D. Strictly speaking, however, the modern newspaper had its origin about the time that printing was introduced into western Europe. In the 16th century it was represented by news sheets consisting of single folio pages. In 1566 the Venetian Government established the official *Notizie Scritte,* containing accounts of events of general interest. At first they were not printed, but might be read in various public places, on the payment of a small coin called a *gazzetta,* from which is derived our name *Gazette.*

The first newspaper of the modern type was the *Frankfurter Journal,* issued in 1615, and the first English newspaper was the *Weekly Newes,* 1622. The first English daily newspaper was published in 1702, and in 1709 the penny paper originated. France brought out a newspaper in 1631 and Russia published one in 1703 under the authority of Peter the Great. Advertisements appeared as early as 1652. *Publick Occurences* was the first newspaper printed in the United States. It was issued in 1690 in Massachusetts, but was suppressed by the government. In 1704 the Boston *News-Letter* was begun, and is regarded as the first American newspaper. Among the earlier newspapers may be mentioned the Boston *Gazette,* issued in 1719, and the New York *Gazette,* issued in 1725. The *Advertiser,* issued in 1784, was the first daily printed in Philadelphia. There are now about 60,000 newspapers. Of these there are over 22,000 in the United States; 10,000 or thereabouts, are published weekly, and 4000 daily. Great Britain has 9500 papers; Germany, about 8000; and France, 6700.

MAKING THE MODERN NEWSPAPER. Originally the newspaper was printed on one side of the paper by means of a hand-screw press, and the sheets were small and the edition limited. At that time the proprietor was editor, compositor and printer, just as he is now in small towns where weekly journals are printed. In the cities the daily newspaper has its work systematized and its force well organized under the following departments: editorial, news, advertising and printing. The editor-in-chief determines the policy of the paper and decides to what items to give the most prominence, and under him are the different department editors, with their staff of correspondents and reporters. For strictly local matters there is a city editor, and for all foreign matters a special editor is in charge. News and local items are gathered and written up by the reporters, while the political and financial questions are looked after by editors specially chosen for this work. There is also a telegraph editor who takes care of all telegraphic matter (See ASSOCIATED PRESS). The matter of each department is supervised by the editor of that department, who selects what he deems desirable to publish. Afterwards the matter is sent to the composing room, where the copy is set up in type by linotype machines. From the composing room the set-up type is sent to the foundry room, and there the stereotyped, circular plates (See STEREOTYPE) are cast to fit the cylinder printing press (See PRINTING PRESS). These web-perfecting presses print both sides of the sheet at the same time, as it is fed from a roll of paper. It also cuts and folds the papers ready for distribution. The capacity of some of these presses reaches 150,000 12-page papers per hour.

The dailies usually appear in the morning; therefore most of the work on them is done at night, and this is so divided among the different departments that it is performed rapidly. Pen and ink drawings are made by the artists, from which half tones and zinc plates (See HALF TONE; ZINC ETCHING) are prepared for illustrating the article.

MANAGEMENT. A manager is employed to look after the financial part of the business, and under him are the heads of the advertising and circulation

departments. As the modern newspaper usually sells for a price below the cost of printing and paper, the income is derived chiefly from advertisements; and as the value of these depends largely upon the circulation of the paper, the man in charge of the circulation department is constantly working to increase the list of readers.

**Newt,** a small Amphibian of the Salamander Family found in streams and ponds of North America. The eggs are deposited upon the leaves of pond weeds and hatch in a month or month and a half into green, fishlike animals, which inhabit the water and live upon the animal and vegetable life which it affords. At the end of the season they become lung-breathing animals, lose their gills and make their homes under the half-decayed logs of the adjacent woodlands. Here they live for three or four seasons until they reach maturity, when they again take to the water to spend the remainder of their lives as gill-breathers. Many species of newts are found in the woods and waters of the United States.

**New'ton, Sir Isaac** (1642-1727), a famous English mathematician, philosopher and astronomer, born at Woolsthorpe, Lincolnshire. When 12 years of age he was sent to Grantham to attend school. From early youth he showed an inventive turn of mind, preferring to make kites, windmills and other mechanical toys rather than engage in the sports of his playmates. In 1661 he entered Trinity College, receiving his degree of bachelor of arts in 1665. In 1667 he became a fellow of the Trinity, and in 1668 received from that college his master's degree.

From 1669 to 1701 he filled the chair of mathematics at Cambridge. During the years at Cambridge he was pursuing the lines of investigation which have resulted in incalculable value to the world. In the field of optics he discovered the components of white light and explained the color of natural bodies; investigated the laws of the refraction of light; and invented the refracting telescope. He also estimated the length of light waves. During this time he was working on his *Principia,* which is the basis of modern mathematics and physics. He discovered the laws of gravitation and formulated them. He then applied them to the movements of the heavenly bodies and verified Kepler's Laws. He was also the discoverer of differential calculus, although this honor should perhaps be shared with Leibnitz.

In 1689 Newton was made member of Parliament as representative of the University of Cambridge, and maintained the rights of that institution in a critical period of its history. In 1672 he became a member of the Royal Society, and in 1703 was elected president, a position of great honor, to which he was regularly reelected for a period of 24 years, holding the office to the end of his life.

In 1696 Newton was made warden of the mint, a position which did not impose more service than he could render in connection with his professorship in Cambridge. His scientific knowledge was of very great value in the recoinage, and he gave to it his best efforts. In 1699 he was promoted to the position of master of the mint, which he held until his death. This position was more remunerative and justified him, financially, in resigning his professorship, which he did in 1701. In 1705 he received the distinction of knighthood. See ASTRONOMY; GRAVITATION; TELESCOPE; SOLAR SYSTEM.

**Newton, Kan.,** a city and the county seat of Harvey Co., 201 m. s.w. of Kansas City, on the Missouri Pacific, the Atchison, Topeka & Santa Fe and other railroads. Situated in the valley of the Arkansas River, one of the most fertile sections of the state, the town derives its revenue chiefly from agricultural activities. It has a considerable trade and large stock-raising interests. Manufacturing is promoted by natural gas, the principal plants being flour mills, a thrashing-machine factory, drill works, a separator factory and an ice factory. There are also a creamery and stockyards. At Newton there is a large set-

tlement of German-Russian Mennonites, who immigrated in 1873, and who maintain here a hospital and Bethel College, the only college in America controlled by the Mennonite sect. There is a Carnegie library in the town. Newton, first settled in 1871, was chartered as a city in 1872. Population in 1910, 7862.

**Newton, Mass.,** a city of Middlesex Co., 6 m. w. of Boston, on the Charles River and on the Boston & Albany Railroad. The city occupies an area of about 18 sq. m., and included within the municipal limits are the villages of Newton Center, Newton Upper Falls, Newton Lower Falls, Newtonville, Auburndale, West Newton, Newton Corners and Newton Highlands. Newton has a site of great beauty and is one of Boston's attractive suburbs. Though primarily a residential city, Newton has extensive manufactures, which include paper boxes, curtains, boots and shoes, cordage, railway signals, hosiery, motor vehicles, starch, dry plates, pianos, cottons, chemicals and worsteds. The Charles River furnishes abundant water power for the promotion of the manufacturing interests. The Lasell Seminary for women, the Allen School for boys and the Newton Theological Institution (Baptist) are located here. The town was settled in 1631 and was a part of Cambridge until 1688, when it was incorporated under the name of New Cambridge. Near the site of Waban's Wigwam, where John Eliot began to preach to the Indians on Oct. 28, 1646, stands the Eliot Memorial. A large cemetery in the heart of the city contains the graves of many people noted in history. Newton is one of the wealthiest cities per capita in the United States. It was chartered as a city in 1873. Population in 1910, 39,806.

**New West'minster,** the former capital of British Columbia, situated on the north bank of the Fraser River and on the Canadian Pacific Railway, 75 m. from Victoria. Among the prominent buildings are the Columbian College, the Roman Catholic convent and college, the Provincial Asylum for the Insane and the Dominion Penitentiary. The export lumber and fish trade is extensive, and among other industrial establishments are a paper mill, glass works, steel-pipe works, soda-water works, a brewery and a distillery. Population in 1911, 13,199.

**New Year's Day,** the first day of January, beginning a new year. In different periods of history and among the different nations, various times of the year have been reckoned as the beginning of the year, but at whatever time the year began, the first day has been observed as a festival or holiday from the most ancient times. Watching the old year out and the new year in, ringing of bells at midnight to mark the passing, and New Year's calls and greetings are popular customs. See CALENDAR.

**New York,** THE EMPIRE STATE, one of the Middle Atlantic States, is bounded on the n. by the provinces of Ontario and Quebec, on the e. by Vermont, Massachusetts, Connecticut and the Atlantic Ocean, on the s. by New Jersey and Pennsylvania and on the w. by Pennsylvania, Lake Erie and the Province of Ontario. Nearly one-half of the boundary line is water. In lakes Champlain and Ontario the line follows the deepest channel, giving New York a little less than one-half of each of these bodies of water.

SIZE. The greatest length from east to west is 326 m., or 412 m. including Long Island. The width from north to south is 312 m. The area is 49,204 sq. m., of which 1550 sq. m. are water. New York is a little smaller than Maine, Vermont and New Hampshire combined, a little smaller than England, a little larger than Louisiana and the 29th state in size.

POPULATION. In 1910 the population was 9,113,614. Between 1900 and 1910 there was a gain in population of 1,844,720, or 25.4 per cent. There were 191.2 inhabitants to the square mile. The state ranks first in population. Of the total number of inhabitants more than one-half are found in New York City.

SURFACE. The northeastern part of the state is occupied by the Adirondack Mountains, which constitute its most

prominent physical feature. These mountains extend southward to the Valley of the Mohawk and westward to the slope which descends from Lake Champlain. Their sides are covered with forests and in their valleys are many beautiful lakes. The highest peak, Mt. Marcy, 5345 ft., is the highest point in the state. There are a number of other peaks ranging from 2000 to 4000 ft. in altitude (See ADIRONDACK MOUNTAINS).

South of the Adirondacks is the Mohawk Valley, which extends from the southeastern boundary of Lake Ontario to the Hudson River near Albany. This is a low, narrow valley with nearly a level slope. South of the Mohawk Valley are the Catskill Mountains. These form a group rather than a range, and have elevations ranging from 2000 to 4000 ft., Slide Mountain, the highest peak, having an altitude of 4205 ft. Their slopes are wooded, but they do not contain such extensive forests as the Adirondacks. In the southeastern part of the state is a mountain range extending northward to about the head of Lake Champlain. This is a continuation of the Taconic and Hoosac mountains in Massachusetts. To the west of these mountains lies the narrow Valley of the Hudson River, which in the lower part of its course cuts its way through one of these ranges, forming the beautiful Highland Region.

West of the Catskills and occupying all of the southern and central parts of the state and extending to its western boundary is the great plateau region, having an elevation varying from 1000 ft. in the east to 2000 ft. in the west. Numerous rivers have cut deep valleys in this plateau and there are also a number of depressions formed by glacial action, many of which are occupied by lakes. North of the plateau the land descends by two terraces and gentle slopes to Lake Ontario. The terrace farthest inland from the lake is formed by a crest of limestone that forms the escarpment over which Niagara Falls plunges, and on which the Erie Canal passes at Lockport.

RIVERS AND LAKES. The northern slope of the state is drained into Lake Ontario and the St. Lawrence River. The Raquette, Oswego, Black and Genesee are the most important streams flowing into Lake Ontario. The eastern part of the state is drained by the Hudson, which is the most important stream within its boundaries, and distinctively a New York river. Its chief tributary is the Mohawk. The southern part is drained into Delaware and Chesapeake bays by the Delaware and Susquehanna rivers and their tributaries, and a smaller portion of the western part is drained into the Allegheny, thence into the Ohio and the Mississippi.

New York has a large number of lakes. Many of these are found in the glens and valleys in the Adirondacks and Catskill ranges, and contribute much to the beauty of these mountains. In the central part of the state are a number of long, narrow bodies of water, designated because of their form, the "Finger Lakes." The largest are Seneca and Cayuga, each about 40 m. long and from 1 to 4 m. wide. Oneida Lake, northeast of these, is 20 m. long and about one-fourth as wide. Chautauqua Lake in the western part of the state is noted as a summer resort and educational center. Lake George, south of Lake Champlain, is surrounded by mountains and is one of the most beautiful mountain lakes in the world.

SCENERY. The Adirondack and Catskill regions are especially attractive to summer visitors and contain many cottages and villas which are the summer homes of people from all parts of the country. In the heart of the Adirondacks the state has set apart a large area as a forest preserve, in which forests and game will be protected. Thousand Islands Park in the St. Lawrence River is also widely known as a summer resort. The Valley of the Hudson is known far and wide for its beauty, and on the western boundary the Niagara Falls and River are objects of world-wide interest. Within the state also are many gorges, cascades and cataracts of more than local

reputation, some of which are now included in a state park. Among these are the Genesee Falls near Rochester, Kaaterskill Falls in Greene County, Cohoes Falls in the Mohawk, Glens Falls near the city of the same name and Ausable Falls in Wilmington.

Climate. Owing to the influence of the ocean, Long Island and Staten Island have an equable climate, though some days in summer are intensely hot. In the northern part of the state among the Adirondacks the winters are long and severe and deep snows are common, but the summers are cool and delightful. The central and western parts have milder winters and warm summers. The annual rainfall varies from about 50 inches in the east to 40 inches in the west, being 35 inches in most of the state.

Minerals and Mining. In the Adirondack region are valuable deposits of iron ore, which were formerly more extensively worked than now, owing to the development of the mines in the Lake Superior region. The output from these mines, however, is still important. Salt is found in large quantities in the central part of the state, and there are extensive beds of clay along the Hudson in the lower part of its course. New York is the leading state in the production of gypsum. Talc, limestone, red and brown sandstone, marble, and rock for making cement are quarried in paying quantities. Petroleum and natural gas are found in the western part of the state. The manufacture of brick is one of the leading mineral industries. The mineral springs at Saratoga and other points make New York the second state in importance in the production of mineral water.

Forests and Lumber. The most extensive forests are in the region of the Adirondacks. They contain white pine, spruce and hard woods. There are smaller forest areas among the Catskills. Lumbering is now practically restricted to cutting spruce for the manufacture of wood pulp and to the production of lumber and timber for local needs. Much lumber is found on farm wood lots, where it is very valuable for farm buildings, most of which are constructed of the lumber on the farms.

Agriculture. With the exception of some of the rock regions among the mountains and a few sandy hills the soil of two-thirds of the state is suitable for agriculture, and most of the fertile land is under cultivation or used as pasturage. The average size of the farms is smaller than that of those of the Central West and larger than that of those in some of the New England States. Diversified farming is generally practiced.

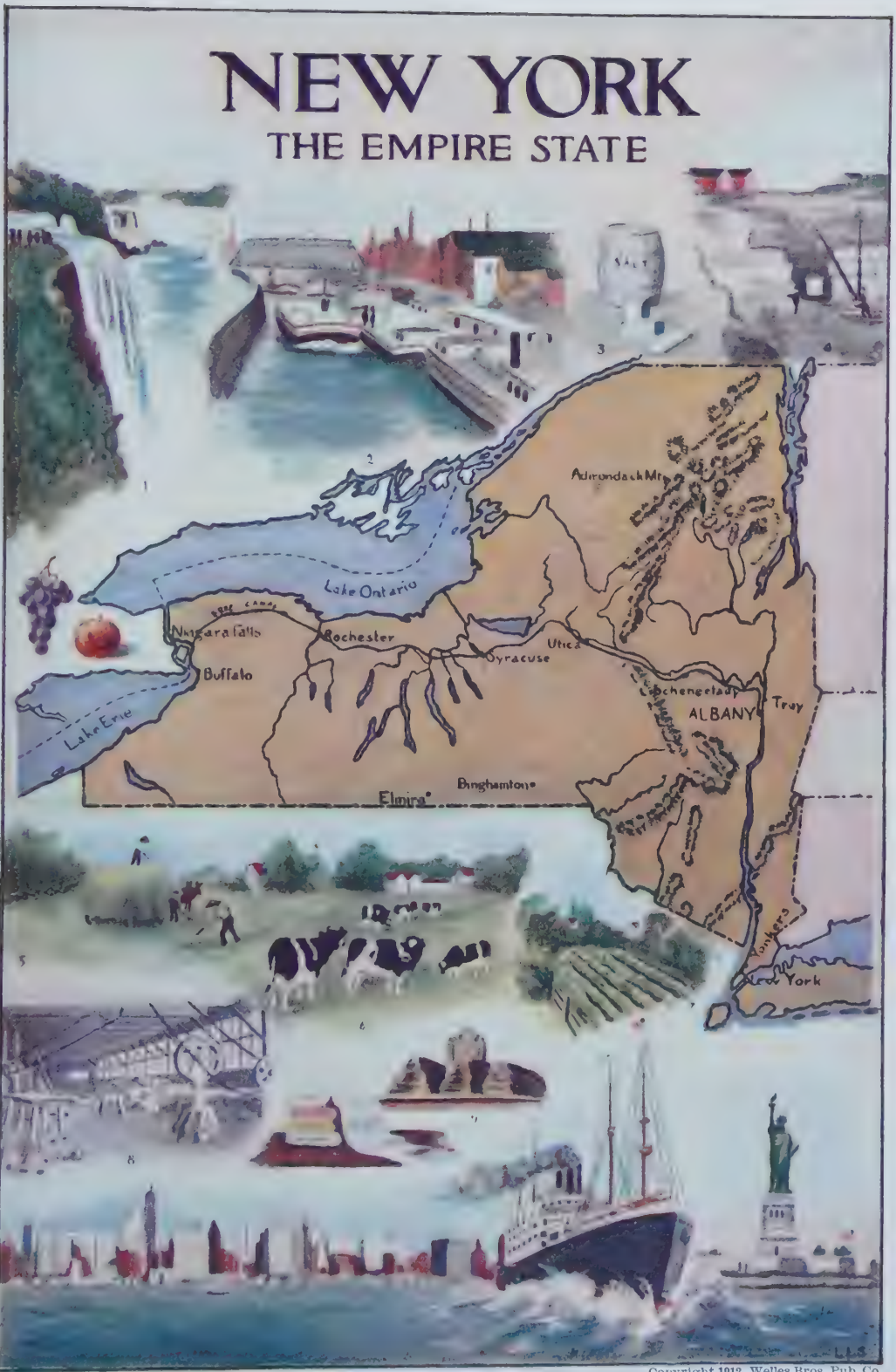
*Soil.* In the river valleys the soil is composed largely of alluvium, but that in the uplands is formed from decomposed limestone, shale and other native rock, and is adapted to growing general farm crops, fruits and vegetables. In most localities fertilizers are used to considerable extent, and good yields are generally secured, except in the southern plateau region, where the valleys are very productive but the hills give poor returns to the farmer.

*Products.* The leading field crops are hay, potatoes, oats, corn, wheat, beans, buckwheat, rye, tobacco and barley. In the central and western parts of the state apples, peaches and grapes are raised in large quantities. In all localities near cities garden vegetables are grown. The farms on Long Island and along the Hudson north of New York City are generally devoted to market gardening.

New York is one of the leading dairy states, and the income from dairy products forms nearly one-third of the entire agricultural income of the state. Hops and tobacco are raised in the central part of the state. The growing of flowers for the market is an important industry near the large cities. Some farmers derive a good income from pure-bred dairy cattle. The revenue from poultry is constantly increasing. In the northern and southern parts of the state maple sugar is produced in large quantities; New York ranks next to Vermont in the production of this delicacy. New York as a whole is one of the leading agricultural states in the country.

# NEW YORK

## THE EMPIRE STATE

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1. Niagara Falls
2. Erie Canal
3. Salt
4. Quarrying
5. Hay
6. Dairying
7. Gardening
8. Machinery
9. Clothing
10. N. Y. City Skyline
11. Commerce
12. Statue of Liberty

NEW YORK

MANUFACTURES. Manufacturing is the chief industry and New York leads the Union in the extent and variety of its manufactured products. Abundant water power, excellent transportation facilities and convenient location of manufacturing centers with reference to sources of raw material and markets have been the important factors in developing the great manufacturing industries of the state. The cities of New York and Buffalo are the chief manufacturing centers, but factories of various sorts are widely distributed over the state.

The lumber industry leads in the forest region of the Adirondacks. Along the Hudson are the largest brickyards in the world, the annual value of their output exceeding $12,000,000. The manufacture of clothing ranks first among the factory products, the chief centers of this industry being New York City and Rochester. Next in order of value are cotton and woolen goods, silks and other textiles. The manufacture of typewriters and other small machines is also important. The manufacture of agricultural implements, heavy machinery and foundry products also gives employment to a large number of workmen. Syracuse is noted for its soda-ash works, the largest in the world, and Troy for the manufacture of its collars and cuffs. The great power plants at Niagara have caused numerous factories to be located there, and power from the falls is sent by current to many other cities. Among the most important of these plants are those for the production of aluminum and the manufacture of carborundum. See NIAGARA FALLS, N. Y.

Rochester is the leading center for the manufacture of cameras and other optical instruments. The canning of fruits and vegetables, the production of condensed milk and the production and canning of foods are also widely extended industries. New York is first in the manufacture of clothing, optical instruments, typewriters, shirts and collars, and ranks with Michigan in the production of salt. It is second only to Pennsylvania in the output of brick and tile.

TRANSPORTATION AND COMMERCE. The trunk lines of the New York Central and West Shore railroads extend across the state from Buffalo to Albany, thence down the Hudson Valley to New York City. The New York Central system controls most of the railroads in the state and has numerous branches so extending from its main line as to reach nearly all commercial and industrial points. The Erie, the Lehigh Valley, the New York, Ontario & Western and the Delaware & Hudson railroads also extend through the state and supplement the lines of the New York Central system. Most parts of the state have ample railroad facilities. Numerous electric lines connect villages and small towns with near-by cities.

The great water route connecting Lake Erie and the Atlantic by means of the Erie Canal and Hudson River is one of the most important factors in developing the industries of the state (See ERIE CANAL). Steamers ascend the Hudson as far as Albany and Troy and an extensive traffic is carried on this route. A canal connects the Hudson with Lake Champlain, which is also connected by a canal with the St. Lawrence River. New York City is the chief seaport and commercial center of America and is connected by regular lines of steamers with the leading ports of the world. Several trans-Atlantic cables also have their western terminus in this city.

New York is a leading commercial state. Over 35 per cent of the exports and 64 per cent of the imports of the United States pass through the port of New York. This city is also the terminus of numerous trunk lines of railroad, which with their connections extend to the Central West and the Pacific coast, so that the inland trade of the city exceeds that of foreign countries. The manufactured goods of the state are distributed throughout the country and large quantities of raw material are imported from other states. In addition to this the handling of the food supplies necessary to meet the needs of the large cities of the state is in itself an enormous

business. New York and Buffalo are the chief commercial centers.

GOVERNMENT. The present constitution was revised in 1894. According to its provisions a convention for revising the constitution must be called at least once in 20 years. All male citizens 21 years and over can vote, unless they are imbeciles or criminals. The governor, lieutenant-governor, secretary of state, comptroller, treasurer, attorney-general and state engineer and surveyor are elected biennially by popular vote. The governor appoints a superintendent of public works, a superintendent of banking, of insurance and of state prisons, a factory inspector, a commissioner of agriculture, a commissioner of labor statistics and an excise commissioner. He has the power of veto, but a bill can be passed over his veto by a two-thirds vote of the Senate and Assembly. The commissions of health, lunacy and charities, and of railroads, forests, quarantine and tax equalization constitute the most important state boards.

The Legislature consists of a Senate of 50 members and an Assembly of 150 members. Senators are elected for two years and assemblymen for one.

The judicial department comprises a Court of Appeals consisting of a chief justice and six associate justices, and a Supreme Court of 76 justices, all chosen by popular vote for 14 years. The state is divided into eight judicial districts in which these judges hold court. Lower courts consisting of County Courts, City Courts, Surrogate and justice courts are established when needed.

EDUCATION. The public schools of New York are noted for the completeness of their equipment, thoroughness of instruction and general efficiency. The schools are under control of the State Board of Regents, consisting of 12 members elected by the Legislature and known as the University of the State of New York. The executive officer of this board is the commissioner of education. He has general supervision of the schools of the state, and also of the state library and museum.

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The state maintains a normal college at Albany for the training of high school teachers, and 15 normal schools for the training of teachers in the elementary schools. The state agricultural college and experiment station is connected with Cornell University at Ithaca. There is a state experiment station at Geneva, and schools of agriculture are located at Canton, Alfred and Morrisville. Higher institutions of learning not under control of the state are: Cornell University at Ithaca; Columbia University, New York University and the College of the City of New York at New York; Syracuse University at Syracuse; Vassar College at Poughkeepsie; Colgate University at Hamilton; St. Lawrence University at Canton; Hobart College at Geneva; Union University at Schenectady; the University of Rochester at Rochester; Rensselaer Polytechnic Institute at Troy; St. John's and St. Francis Xavier at New York City. In addition to these there are numerous medical and technical schools and theological seminaries throughout the state. The United States Military Academy is at West Point.

STATE INSTITUTIONS. The asylums for the feeble-minded are at Syracuse and Newark. The school for the blind is at Batavia and the school for crippled and deformed children is at Tarrytown. The state maintains 14 hospitals for the insane. State prisons are located at Sing Sing (Ossining), Auburn and Clinton, and there are reformatories at Elmira, Napanoch and Bedford. That at Bedford is for women. There are also several reform schools and industrial schools for juvenile offenders. In all, the state maintains over 500 charitable and penal institutions.

CITIES. The chief cities are Albany, the capital; New York, Buffalo, Rochester, Syracuse, Troy, Utica, Yonkers, Binghamton, Elmira, Schenectady, Auburn, Newburgh, Kingston, Poughkeepsie and Cohoes.

HISTORY. New York, named for the Duke of York, later James II, was visited in 1609 by Champlain, who came by way of Canada and Lake Champlain,

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and by Henry Hudson, in the Dutch East India Company service, who entered the harbor and ascended the Hudson River. Having made peaceful arrangements with the Iroquois, the Dutch were profitably dealing in furs with them as early as 1612. In 1614 Ft. Nassau was established within the present limits of Albany. Albany was settled in 1624; New Amsterdam (New York), two years later. After years of friction with the Puritans on the east, the Swedes on the south and with the Indians, and after, too, the conciliating rule of Peter Stuyvesant, the Dutch lost New York in 1664, when Charles II granted the Duke of York all the land "from the west side of the Connecticut River to the east side of Delaware Bay." Sir Edmond Andros then governed the colony nine years.

The state was the scene of much violence during the last French and Indian War (1754-60). New York was active in the pre-Revolutionary struggle. In 1775 it established an independent government; in 1776, adopted a constitution; in 1778, ratified the Articles of Confederation, though opposing strong central government, and in July, of the same year, as the 11th state, agreed to the Constitution. For years after 1800, the Anti-Federalists, chiefly under De Witt Clinton, were a power in the state. The completion of the Erie Canal, 1825, caused the marvelous growth of such cities as Buffalo, Rochester and New York. In 1831 New York did away with imprisonment for debt. Though bound to the South, commercially and socially, New York furnished 490,000 men and about $90,000,000 for the Union army during the Civil War. Since the war the state has enjoyed phenomenal prosperity. Consult Roberts' *New York,* in the American Commonwealths Series.

GOVERNORS. George Clinton, 1777-1795; John Jay, 1795-1801; George Clinton, 1801-1804; Morgan Lewis, 1804-1807; Daniel D. Tompkins, 1807-1817; John Taylor, 1817; De Witt Clinton, 1817-1823; Joseph Christopher Yates, 1823-1825; De Witt Clinton, 1825-1828; Nathaniel Pitcher, 1828-1829; Martin Van Buren, 1829; Enos Thompson Throop, 1829-1833; William Learned Marcy, 1833-1839; William Henry Seward, 1839-1843; William C. Bouck, 1843-1845; Silas Wright, 1845-1847; John Young, 1847-1849; Hamilton Fish, 1849-1851; Washington Hunt, 1851-1853; Horatio Seymour, 1853-1855; Myron Holley Clark, 1855-1857; John Alsop King, 1857-1859; Edwin Dennison Morgan, 1859-1863; Horatio Seymour, 1863-1865; Reuben Eaton Fenton, 1865-1869; John Thompson Hoffman, 1869-1873; John Adams Dix, 1873-1875; Samuel Jones Tilden, 1875-1877; Lucius Robinson, 1877-1880; Alonzo Barton Cornell, 1880-1883; Grover Cleveland, 1883-1885; David Bennett Hill, 1885-1892; Roswell Pettibone Flower, 1892-1895; Levi Parsons Morton, 1895-1897; Frank Swett Black, 1897-1899; Theodore Roosevelt, 1899-1901; Benjamin Barker Odell, 1901-1905; Frank Wayland Higgins, 1905-1907; Charles Evans Hughes, 1907-1910; Horace White, 1910; John A. Dix, 1911-1913; William Sulzer, 1913; Martin H. Glynn, 1913-1915; Charles S. Whitman, 1915—. William Sulzer was impeached.

**New York, City of, N. Y.,** largest city in the state, commercial metropolis of the United States and second city in size in the world, advantageously situated on the Hudson, or North, River, where it flows into the New York Harbor and the Atlantic Ocean; the strait, or East River, flows through the city, connecting with Long Island Sound. The city is 226 m. n.e. of Washington, 232 m. s.w. of Boston and 911 m. e. of Chicago, and is the terminal of the main lines of the New York Central & Hudson River, the Pennsylvania, the Baltimore & Ohio, the Lehigh Valley, the Central of New Jersey, the Erie, the New York, New Haven & Hartford, the Delaware, Lackawanna & Western, the West Shore, the New York, Ontario & Western, the Long Island, the New York, Lake Erie & Western and other railroad systems. New York is today the leading seaport of the world, and 157 steamship and steamboat lines run not only to points on

the coast, Sound and river, but to various ports of the world. What is now known as the "port of New York" has a total water front of 444 m.

General Description. Although very irregular in shape, the city is in extreme dimensions about 35 m. long and about 17 m. wide and has the largest area of any city in the United States, covering 327 sq. m. The land area comprises 209,218 acres. Previous to 1874 the city did not extend beyond Manhattan Island. Parts of the southern portion of Westchester County were annexed during that year and other parts of Westchester in 1895. In 1898 the city's boundaries were enlarged, and what is now known as Greater New York is composed of five boroughs: the borough of Manhattan, on Manhattan Island, including a number of small islands; the borough of Richmond (Staten Island); the borough of Brooklyn; the borough of Queens; and the borough of The Bronx, which is the extreme southeastern portion of the mainland of New York State.

The harbor of New York is one of the largest and best in the world, and one of the few which can be cheaply adapted to the increasing size of ocean steamers and the enormous growth of international commerce. The harbor, which is strikingly beautiful, is practically divided into three parts, the lower bay, the upper bay and the North and East rivers. The North River is the great commercial feeder by which the traffic of the Hudson River and the Erie Canal is brought to this port. The coastwise trade with New England reaches New York through Long Island Sound and the East River. The Harlem River, separating Manhattan from The Bronx, is a place of anchorage for small craft. The piers of the trans-Atlantic steamship companies are on the North River, part of them being at Hoboken on the New Jersey side. The East River has the docks of factories, sugar refineries, warehouses and government storage houses; great basins for canal boats; and the Erie and Atlantic basins. See East River; Hudson River; Erie Canal.



Bridges, Ferries and Subways. There are 45 bridges in the city of New York, of which four—New York and Brooklyn, Queensboro, Williamsburg and Manhattan—rank among the great bridges of the world, having lengths of from 2793 ft. to 7449 ft. and main spans of from 1470 to 3724 ft. The Harlem River is crossed by about 12 bridges, including High Bridge, which carries the city's aqueduct. There are also ferry lines operating to all points on both sides of the city, but the Pennsylvania and the Hudson River tunnels have in a great degree taken the place of the ferryboats for passenger traffic between Manhattan and railroad terminals in New Jersey. A subway reaching from Van Cortlandt Park, or 242d Street, in The Bronx, through New York to Brooklyn and Queens, has been constructed at enormous expense. A dual system of subways has also been provided for at a cost of $325,000,000, the contract being signed on March 19, 1913. The only means of transportation, however, to North Brother, Randalls, Wards, Bedloes, Ellis and other islands owned by the municipality, is by ferryboats. The ferry line to Staten Island is owned and operated by the city. There are elevated lines on Second, Third, Sixth and Ninth avenues which converge at the Battery, and a network of surface cars traverse the city in all directions. Submarine cables and wireless-telegraph stations place New York in direct communication with all the cities of the world. The famous Bartholdi statue of *Liberty Enlightening the World* is located on Bedloes, or Liberty, Island, two miles southwest of the Battery.

Parks, Streets and Boulevards. New York has a park system of 7500 acres valued at over $5,000,000. The system includes 175 parks, 35 parkways and four plazas. The principal parks are Central Park in Manhattan, of 840 acres, Bronx, Van Cortlandt and Pelham Bay parks in the borough of The Bronx, and Prospect Park in Brooklyn. Central Park is situated between 59th and 110th streets and between Fifth and Eighth

# A CANYON WALLED BY LOFTY BUILDINGS

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LOWER BROADWAY, NEW YORK

On the left rises the steeple of Trinity Church, an historic landmark. The Woolworth Building looms dimly in the distance.

# THE GIANT OF THE SKYSCRAPERS

Height—
780 feet

Number of
Stories—55

Total Weight-
206,000,000
pounds

Floor Area—
40 Acres

Number
of Electric
Lights—
80,000

Miles of
Plumbing—43

Number of
Elevators—28

Combined
Height of
Elevator
Shafts—
2 Miles

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WOOLWORTH BUILDING, NEW YORK

**This great building towers 225 feet higher than Washington Monument.**

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avenues, Manhattan. Bordering on the city line of Yonkers is Van Cortlandt Park, in which is the Van Cortlandt Mansion, built in 1748 and occupied by Washington and Rochambeau in 1781, and which is now a Revolutionary museum. Bronx Park reaches from 180th Street to 205th Street, the northern part being occupied by the New York Botanical Gardens and the southern part by the Zoological Park. Battery Park occupies the extreme southern end of the city next the sea wall and contains the famous New York Aquarium and a children's playground. Among the better known of the city's smaller parks and squares are Union, Washington, Madison, Bryant and Tompkins squares and City Hall, Riverside, Morningside, Mt. Morris, Audubon and De Witt Clinton parks. Recreation piers projecting into the Hudson and East rivers are interesting features of New York's summer life.

The streets of New York have a mileage of about 4000. The city originally began at the lower end of Manhattan Island and has spread mainly north and east. The business center of the city above 14th Street is laid out in rectangular avenues and squares. Broadway is the most important of the avenues and is unfortunately narrow in the extreme down-town part of its length. At Tenth Street it bears off to the northwest, and from 60th Street to 162d Street it is called the Boulevard; from this point to the Yonkers city line it is known as the famous Kingsbridge Road or "Speedway." The principal shopping districts are on Broadway from Eighth Street to 34th Street and on Sixth Avenue from 14th to 34th streets, but a shopping district has arisen on 125th Street. Fifth Avenue, second in fame to Broadway, extends from Washington Square to the Harlem River. Fifth Avenue ranks as the foremost street of wealth and fashion in the United States. Between 50th and 90th streets, Fifth Avenue has many magnificent residences, and Madison Avenue vies with it in the elegance of its private dwellings. West End Avenue, Central Park West, and Riverside Drive are splendid residence streets. The wholesale dry-goods district is on lower Broadway and the streets between Prince and Reade streets. The wholesale-grocery section lies immediately west of this. Maiden Lane and vicinity has the wholesale-jewelry trade. Wall and Broad streets, where center the financial interests of the city and nation, are east of Broadway in the down-town part of the city. A little farther up town on the East Side is the tenement district, one of the most crowded in the world. This district contains a large portion of the foreign population.

Public Buildings. Among the many notable public buildings of the city are the custom-house, built in 1902-07; the United States Subtreasury, on Wall Street, on the site of Federal Hall, in which George Washington was inaugurated first president of the United States; the post office; the city hall, one of the handsomest of New York's earlier buildings; the courthouse; the Hall of Records, in the style of the French Renaissance; the Chamber of Commerce; the United States Realty; the Produce Exchange; the New York Clearing House; the Cotton Exchange; the Stock Exchange; and the new Municipal Building of 40 stories, which cost about $19,000,000. The main part of this building is 24 stories high and is pierced by an arcade through which runs Chambers Street. The tower itself includes the space from the 25th to the 40th stories. Other "skyscrapers," aside from the Municipal Building, which break the city's sky line, are the Singer Building, 41 stories high; the Woolworth, the highest office building in the world, being 30 stories high and having a tower of 25 additional stories; the City Investing Building of 32 stories; the Park Row Building of 30 stories; the Trust Company of America of 23 stories; the Hudson Terminal buildings of 22 stories and four stories underground, including the terminal of the down-town Hudson River tunnels; the "Flatiron," or Fuller, 290 ft. high; the Home Life Insurance; the Equitable

Life Assurance; the Times, 363 ft. high; the Metropolitan Life Insurance, 700 ft. high; the Manhattan Life, the Drexel, the Empire, the Commercial Cable, the Trinity, the Union Trust and the Pulitzer buildings. Wall Street runs from Trinity Church east to the river and is lined with buildings from 12 to 20 stories high, used by banks and financial institutions. The post-office building at City Hall Park was erected in 1875. The Criminal Courts Building, a fine structure on Centre Street, is connected with the Tombs, the city prison, by a covered bridge called "The Bridge of Sighs." There are several large armories in the city, the best known being those of the 7th, 69th and 71st regiments. The Grand Central Station at 42d Street, near Fourth Avenue, has been completely remodeled and enlarged on a magnificent scale. This and the new Pennsylvania Railroad Passenger Station, built of granite and located between 31st and 33d streets and Seventh and Eighth avenues, exceed in magnitude and elegance of equipment any other structures of their kind in the world. The Pennsylvania station has direct connection with the tunnels from New Jersey and Long Island.

Educational Institutions. The oldest and largest institution of higher education in New York City is Columbia University at 116th Street and Broadway. This university, formerly called King's College, was founded in 1754. Farther north, in the borough of The Bronx, are the handsome buildings of New York University. This institution was chartered in 1831 as the University of the City of New York. It received its present name in 1896. Fordham University (Catholic), now included in New York City, was founded in 1841 as St. John's College. Other Catholic institutions include the College of St. Francis Xavier, St. John's College and Manhattan College. Barnard College for women and Teachers' College (coeducational), with which is incorporated the Horace Mann School, are affiliated with Columbia University. Other institutions of learning include the General Theological Seminary of the Protestant Episcopal Church, the Union Theological Seminary (Presbyterian), the Jewish Theological Seminary of America, the College of Physicians and Surgeons, the New York Post-Graduate Medical School, the Polyclinic Medical School, the New York Law, one of five law schools, a normal college for girls and a city college for boys. Cornell University maintains part of its medical department in New York. Cooper Union and the People's Institute occupy prominent places among the educational institutions of the city. There are also a school of commerce, finance and accounts, many private secondary schools, three art schools, five schools of music and about 38 private academies. Greater New York contains many parochial schools and more than 550 public school buildings, including 21 high schools, trade and vocational schools. The city has a budget allowance for annual salaries of the supervising and teaching staff, of over $29,000,000. The board of education of the city has controlled since 1874 a nautical school, a training ship being loaned for the purpose by the United States Navy Department. A teacher's retirement fund was established in 1894.

Churches. Exclusive of Brooklyn, which is known as the "City of Churches," New York contains about 900 churches. The city became the see of a Catholic bishop in 1808 and of an archbishop in 1850. One of the most notable churches is Trinity Church in Broadway at the head of Wall Street. This church has the longest continuous history of any parish in New York. In its churchyard are the graves of Robert Fulton, Alexander Hamilton, Albert Gallatin, Capt. James Lawrence and others prominently identified with the earlier life of the city. Among other noted churches is St. Patrick's Cathedral (Catholic), at 50th Street and Fifth Avenue, which is one of the most elaborately decorated churches in the country. The Cathedral of St. John the Divine, near Morningside Park, at 112th

Street, was begun in 1892 and when completed willl have cost from $7,000,000 to $10,000,000. St. Saviour's Chapel and the crypt were completed in 1910. St. Mark's, St. Paul's, Christ, Grace and Church of the Ascension are other prominent Episcopal churches. The first Methodist society in the United States was formed in New York in 1766 and still exists as the John Street Church. The Metropolitan Temple is one of the best known of the Methodist churches. Historically the oldest religious denomination in the city is the Dutch Reformed. The Presbyterian denomination is relatively strong in the city. The First Baptist Church, organized in 1762, is the oldest church of this faith, and the Fifth Avenue Church is the wealthiest church of the Baptist denomination in the city. Included in the number of churches are about 119 Jewish temples and synagogues, 70 Lutheran and about 90 miscellaneous churches and chapels.

Charities and Hospitals. In the United Charities Building on East 22d Street are housed the Children's Aid Society, the New York City Mission and Tract Society and the Charity Organization Society. The United Hebrews Charities was formed by the union of four Hebrew societies in 1874. The Society of St. Vincent de Paul is the Catholic organization. The Russell Sage Foundation has headquarters in the city. Among the most noteworthy domestic and trade schools are: Grace Institute, endowed by W. R. Grace, twice mayor of the city; Baron de Hirsch Trade Schools, with day and evening schools; Clara de Hirsch Home for working girls and Association of Practical Home Making. There are also schools for the blind, oral schools for the deaf, many orphanages and day nurseries and about 30 homes for adults in the boroughs of The Bronx and Manhattan. Among the special hospitals are the Manhattan Eye and Ear Hospital, New York Bacteriological Institute, Neurological Institute, New York Eye and Ear Infirmary and Institute for Medical Research. The general hospitals include the Post-Graduate, the Roosevelt, the Hahnemann, the New York, the St. Luke's, the Mt. Sinai, the Presbyterian, the Wright and the Flower hospitals. The institutions which care for the sick and disorderly are located on Randalls, Wards and Blackwells islands in the East River.

Libraries and Museums. The New York Public Library is the chief library of the city. This library was established in 1895 by consolidation of the Astor and Lenox libraries and the Tilden Trust. In 1902-11 a magnificent new library building was erected in Bryant Park, and the library now contains over 2,000,000 volumes and pamphlets. In 1901 Andrew Carnegie gave $5,000,000 for the establishment of about 65 branch libraries, the city furnishing the sites and also assuming the cost of maintenance. Columbia University has the largest and best equipped of the college libraries. The Mercantile and the New York Society Library are subscription libraries. The Slade (architectural) and the De Milt (reference) libraries are used in connection with the General Society of the Mechanics and Tradesmen Circulating Library. Cooper Union Library has a complete set of newspaper files and patent-office reports.

The most notable of the museums are the American Museum of Natural History, the Metropolitan Museum of Art near Fifth Avenue on 83d Street, the Botanical Gardens in Bronx Park and the New York Aquarium at Battery Park, which contains excellent exhibits of marine life. Among the learned societies of the city are the New York Historical, the American Society of Civil Engineers, the American Geographical and the American Numismatic societies.

Monuments and Statuary. The greatest monument in the city is the mausoleum of Gen. Ulysses S. Grant in Riverside Park, at 122d Street. This tomb was designed by John H. Duncan in 1897. The Soldiers' and Sailors' Monument is in the same park, at 90th Street. This beautiful monument was designed by C. W. Stoughton, A. A.

Stoughton and P. E. Duboy. At the foot of Fifth Avenue is the granite Washington Arch, designed by Stanford White. Among the noted statues are *W. T. Sherman,* by Saint Gaudens; *Nathan Hale,* by MacMonnies, in the City Hall Park; *Shakespeare, Indian Hunter, Pilgrim, George Washington* and *Greeley* by J. Q. A. Ward. There are many other noted statues in the parks and about the city. The Egyptian obelisk, popularly called "Cleopatra's Needle," in Central Park, was presented to the city by the Khedive of Egypt in 1877. This obelisk was brought to New York at the expense of W. H. Vanderbilt in 1880, and erected a year later.

Hotels, Clubs and Theaters. New York is a city of hotels, and its accommodations for strangers are unexcelled by those of any other city in the world. There are about 215 hotels in Manhattan alone. Among the newer hotels which have made their way up town are the New Astor, the McAlpin, the Knickerbocker, the New Plaza, the Majestic, the Waldorf-Astoria, the Manhattan, the Theresa, the Murray Hill, the Belmont, the Holland, the Savoy, the Biltmore and the New Netherland. Among the luxurious noted restaurants are Delmonicos', Martin's and Sherry's. The clubs of New York are important to the social life of the city. The oldest of these clubs is the Union League, organized in 1863. Among other noted clubs are the Metropolitan, the Knickerbocker, the Army and Navy, the University and St. Nicholas. The best known of the theaters of the city are the Broadway, the Belasco, the Lyceum, the Park, the Majestic, the Empire and the New Theater. The Metropolitan Opera House gave, in 1884, under Leopold Damrosch, the first season of German Grand Opera in America. The Hippodrome is one of the largest places of amusement. The Manhattan Opera House was built in 1903.

Trade and Commerce. New York is first in the United States in the importance and magnitude of its financial operations, and it shares with London, Paris and Berlin the distinction of being one of the four leading money markets of the world. Importations, especially of works of art, diamonds, sugar, coffee and rubber, and exportations of medicines, copper, machinery, illuminating oil and hardware are very large as compared with other ports. The number of vessels engaged in the coast trade is many times greater than the number engaged in the foreign trade, and the coast trade is much more valuable. The city is the largest center in America for the dry-goods and wholesale-grocery business. More than $20,000,000,000 of the securities of the country, representing over one-sixth of its wealth, are listed on the New York Stock Exchange.

Industries. The most important industry is the manufacture of clothing. This industry ranks first in the number of establishments, persons engaged, capital invested and value of products. In the printing, engraving and publishing business New York ranks above other American cities. Among the important manufactures are foundry and machine-shop products, paint and varnish, tobacco, bakery products, musical instruments, silk and lace goods, patent medicines, jewelry, millinery, malt liquors, cordage, lumber and slaughtering.

Government. The mayor of New York is elected for a term of four years. He appoints the heads of departments, with the exception of that of finance, and in this department he appoints two commissioners of accounts. He may remove all officers of his appointing with the exception of the members of the board of education and certain judicial officers. The mayor himself is subject to removal by the governor upon the establishment of charges preferred against him. The mayor is chairman of the board of apportionment and estimate, which consists of the comptroller, the president of the board of aldermen and the presidents of the several boroughs. Each October this board prepares the city budget for the ensuing year and the same is submitted to the aldermen for approval. Any action of the aldermen, who are not permitted to increase an ap-

propriation or to reduce that for state taxes, is subject to the mayor's veto, which can be overcome only by a three-fourths vote. Each borough president prepares all contracts relating to his borough, and he is chairman of each of the local improvement boards.

History. The first European to visit the vicinity was Verrazano, an Italian, who came in 1524. In September, 1609, Henry Hudson explored the harbor and the river, and a year later Dutch merchants dispatched several small vessels to engage in the fur trade with the Indians. When the West India Company came into existence in 1621 with chartered rights to the exclusive trade of the coasts of both North and South America, that body chose Manhattan Island for the seat of government and a shipping station. In 1626 Peter Minuit was appointed director-general of the Province of New Netherland, and he bought the entire island from the Indians for goods valued at $24. In 1638 was extended to all friendly European countries the privilege of trading with the West India Company. Minuit was later succeeded in turn by Van Twiller, Kieft and Peter Stuyvesant. The colony prospered and the place was incorporated as a city in 1653. The Dutch, however, did not long retain possession, as the English claimed the entire continent as having been discovered by Cabot.

In 1664 Charles II of England granted New Netherland to his brother, the Duke of York, who took possession of the city and renamed it New York. The Dutch regained the city in 1673 but gave way to the English a year later. In 1690 the first intercolonial congress was held in New York. In 1732 a stage line was established between New York and Boston. In 1790 the city limits were extended and in 1807 Fulton's steamboat, the *Clermont,* began running between New York and Albany. In 1812 a steam ferry was opened to Long Island. The Erie Canal was completed in 1825 and insured the commercial supremacy of New York among the American cities. The political history of New York during the first part of the 18th century was a turbulent one. In 1863 William M. Tweed organized a conspiracy to plunder the city. Col. Edward Waring, as head of the street-cleaning department, revolutionized New York in regard to cleanliness in 1898. The material prosperity of the city is steadily increasing.

Population. It is shown according to the Federal census that New York City adds about 125,000 inhabitants each year; moreover it is the greatest municipality in the world under one central governing authority. The large percentage of the city's foreign born makes it probably the greatest cosmopolitan city in the world. Population of Greater New York in 1910, 4,766,883.

Consult Moses King's *Handbook of New York;* Rand-McNally's *Handy Guide to New York City;* Lossing's *History of New York City;* F. B. Kelly's *Historical Guide to the City of New York;* R. R. Wilson's *New York, Old and New;* and M. J. Lamb, *History of the City of New York.*

**New York, College of the City of.** See College of the City of New York.

**New York University,** at New York City (1831). This is neither a city nor a state institution, but was founded by the private munificence of men and women who desired to aid in meeting the educational needs of a rapidly increasing population. After 80 years the university, which is coeducational and nonsectarian, finds itself in possession of a medical school at First Avenue and 26th Street, of certain properties on Washington Square and a campus of some 22 acres on a beautiful and commanding site above the Harlem River, at about E. 181st Street. The buildings on this campus represent a large investment, and include the $750,000 library with its Hall of Fame, established by Helen Gould Shepard. The university comprises the university college, the schools of law, applied sciences, pedagogy, commerce and veterinary medicine, and a graduate school. Its library contains about 100,000 volumes. There are 4500 students enrolled.

**New Zealand,** *Ze' land,* **Domin'ion of,** a group of islands lying in the Southern Pacific 1200 m. e. of Australia, between 30° and 50° south latitudes. The Dominion, as organized in 1907, comprises North Island and South Island, together known as New Zealand, and Stewart and Cook islands, besides many smaller ones. The total area is 104,751 sq. m., of which North Island has 44,468 sq. m.; South Island, 58,525 sq. m.

Physical Characteristics. The coasts of North and South islands are rocky but indented by fiords remarkable for their scenery and furnishing excellent harbors, some of which are said to be the best of the southern ocean. There are two mountain ranges, which extend in parallel ridges in a northeasterly-southwesterly direction. The rugged beauty of their scenery and the many glaciers that descend their slopes remind the tourist of the Alps, although their height is less. In North Island are active volcanoes, near which is a remarkable region of geysers, hot springs, lakes and beautiful deposits of siliceous matter.

South Island has a large area of plains, almost perfectly level and forming a grazing land of exceptional size and richness. It is largely overgrown with grasses and yields quantities of New Zealand flax. The many rivers of the islands, though beautiful and capable of supplying power, are of little value for navigation because of their rapids, whirlpools and cataracts. The largest river and the only one of importance commercially is the Waikato in North Island. The climate of New Zealand is mild and pleasant in general; snow seldom falls except in the extreme south, but the high winds which prevail during certain seasons are sometimes uncomfortable.

Resources and Industries. The forests, which constitute fully one-third of the Dominion of New Zealand, or about 17,000,000 acres, are among its chief resources. The great tracts of pines yield annually about 414,000,000 ft. of timber and are carefully conserved so that the supply may not be exhausted or even diminished. One of the striking features of the wooded areas are the giant tree ferns that grow from 50 to 60 ft. in height and are of great beauty. The chief occupations of the islanders are those connected with the raising of live stock. The extended grazing lands support large herds of cattle, horses and sheep, and the chief exports are wool, frozen and preserved meats, tallow, hides, leather, live stock and dairy products. The staple grains are wheat, oats and barley.

In the mountains, gold, silver, coal, manganese and antimony are mined in large quantities, and some other minerals are mined in varying amounts. All the common European and American fruits are raised, including oranges and lemons, but so little of the land can be given up to orchards that some fruit must be imported. New Zealand is peculiar in having almost no native animals; the two most worthy of note are the wingless apteryx and the ground parrot. Nearly all other animals have been brought in from other countries.

History, Government and People. New Zealand was discovered by Tasman in 1642 and was visited by missionaries soon thereafter. It was established as a British colony in 1840. Since the establishment of the Dominion of New Zealand, the country has been divided into counties and boroughs. The chief executive is a governor appointed by the Crown, and the legislative department consists of an assembly of two houses. Wellington, on North Island, is the capital.

The natives of New Zealand, the Maoris, are an intelligent people of the Polynesian race. In early times they were cannibalistic savages with a genius for war, both offensive and defensive. There were many tribes and clans, no two of which were long at peace with each other. Their peaceful industries consisted in skillfully tilling the soil and artistically carving and decorating not only their homes but even the high rocky walls of their island home. Their tattooing gave to them the name of "Blue

Lips" when the first English settlers visited the island. Their advance in the past 50 years has been remarkable. Schools and colleges are common, and the native students are said to rival their English fellows in aptitude. The University of New Zealand and the Canterbury Agricultural College are the principal higher institutions. Since 1860 telegraph and telephones have become common, and over 2000 m. of railroad have been built. Every adult of New Zealand is a voter, and the Maoris are proud of the fact that the native women were given the ballot in 1893 at the same time it was given to white women on the islands. The Roman Catholic Church and the Church of England have the largest number of adherents. Population, 1,072,000.

**Ney,** *Na,* **Michel** (1769-1815), one of Napoleon's most famous marshals. He entered the army in 1788 and became, successively, lieutenant, captain, general of division and, in 1804, a marshal of the empire. He fought most efficiently for Napoleon, defeating the Austrians at Günzburg (1805), and engaging in the battles of Jena (1806) and of Eylau (1807). After his capture of the village of Friedland from the Russians on June 14, 1807, he became the idol of the army, and received from Napoleon the title *Brave des braves.* He later served with distinction in Spain and Portugal, and commanded the rear guard on the retreat from Moscow, by his energy and heroism saving the army from utter disorganization. Marshal Ney fought valiantly for Napoleon until after the Battle of Leipsic, but on the latter's abdication, he offered his services to the Bourbons. When Napoleon returned from Elba, Ney again took up the cause of his former chief, and led the last charge of the Old Guard at Waterloo. In December, 1815, he was found guilty of treason and was shot.

**Nez Perce,** *Na" Per" sa',* a tribe of North American Indians once ranging through Oregon, Washington and Idaho. They assumed a peaceful attitude toward the whites until 1877, when they rose in revolt because of being deprived of their lands. They were forced to go to Oklahoma, but in 1884 they were transferred to a reservation in northern Washington; not, however, until a large per cent had succumbed to disease in the South.

**Ngami,** *N'gah' me* a lake of South Africa, situated north of the Kalahari Desert, in Western Rhodesia. Formerly an inland sea, it is now diminishing rapidly, and it becomes merely a marsh during dry seasons, while at flood time it increases to a length of about 30 m. It was discovered by Livingstone in 1849.

**Niag'ara Falls, N. Y.,** a city of Niagara Co., 22 m. n.w. of Buffalo, on the east bank of the Niagara River at the Falls, from which it takes its name, 13 m. s. of Lake Ontario, and on the New York Central & Hudson River, the Erie, the Wabash, the Michigan Central, the Lehigh Valley, the West Shore and other railroads. The International and the Niagara, St. Catherines & Toronto electric railways afford excellent transportation to the many points of interest. The city extends along the level cliffs from above the Falls for a distance of three miles below. Three bridges, one cantilever and two steel-arches, cross the river at this point. The upper steel-arch was when built the longest bridge of its kind in the world, being 1240 ft. long, with an arch span of 840 ft. In the southwest part of the city is Prospect Park, which, with Goat Island and several smaller islands, has been the New York State Reservation since 1885. This reservation is 107 acres in extent. The educational institutions include De Veaux College (Episcopal), chartered in 1853, Niagara University (Catholic), opened in 1856, a public library and a high school. Among the public buildings are the Niagara Falls Memorial Hospital, St. Mary's Hospital and the Federal Building.

The power of Niagara was first utilized extensively in 1861. A hydraulic canal was constructed above the Falls to conduct water to wheel pits. At the bottom of these pits large turbines have been placed, with dynamo-electric machines

attached. After being utilized by the turbines, the water escapes through a tunnel to the gorge below the Falls. Several plants now generate electric currents aggregating over 200,000-horsepower. Three companies on the Canadian side of the river develop power also, and the total power development reaches at least 350,000-horsepower. The last treaty between the United States and Great Britain permits the diversion of 20,000 cu. ft. of water per second from the Niagara River on the United States side and 36,000 cu. ft. of water per second on the Canadian side.

Niagara power is now available throughout the territory extending eastward to Syracuse, 160 m. from Niagara, and westward to London in Canada, 125 m. from Niagara. The area within reach of existing Niagara power circuits in the United States and Canada is approximately 25,000 sq. m., and is traversed by a network of transmission lines having an aggregate length of more than 1000 m. Along the leading industrial establishments of the city of Niagara Falls are paper mills, foundries and machine shops, electrochemical works, flour and planing mills, aluminum works and manufactories of shredded-wheat biscuit, graphite, carborundum, emery wheels, haircloth, plated ware and gas machines. The city is also an important shipping point.

The vicinity and the city proper possess much of historic interest. Niagara Falls is one of the scenic wonders of the world and the city is visited annually by thousands of tourists. The separate villages of Niagara Falls and Suspension Bridge were consolidated in 1892 and chartered as the city of Niagara Falls. The Falls of Niagara were discovered by Hennepin in 1678. Population in 1910, 30,455.

**Niagara Falls and River.** The Niagara River is about 33 m. long and flows northward from Lake Erie into Lake Ontario, draining lakes Superior, Huron, Michigan and St. Clair. It constitutes a part of the boundary between the State of New York and the Province of Ontario. At the beginning of its course the river flows smoothly for 15 m. over a broad plain situated upon a plateau. It then branches at Grand Island, comes together again in a channel from two to three miles in width and dotted with islands. Farther on, the channel grows deeper and narrower and makes a gradual descent of 52 ft., giving rise to rapids. Beyond the rapids, the river, at this point 20 ft. deep, plunges 160 ft. over a ledge in two magnificent cataracts, the American Falls on the east and the Canadian, or Horseshoe, Falls on the west, the two being separated by Goat Island. On the American side the water, falling upon a mass of rock which has resisted its erosive force, is of no great depth; but on the Canadian side the water has excavated a basin as deep as the height of the Falls, in which the velocity of the water is temporarily retarded and the surface rendered sufficiently smooth to make possible the passage of a small steamboat, which carries visitors quite near the foot of the Falls. The spray in front of the Falls rises high in a mass of mist, its beauty enhanced by beautiful rainbows. The upper layer of rock projects outward, so that between the sheet of water and the wall of rock back of it there is a broad space that can be entered by visitors. That back of the American Falls is known as the Cave of the Winds; that on the Canadian side is reached by an elevator and has been fitted up with walks and platforms for the convenience of visitors.

The velocity derived from the fall of the water has caused the wearing down of the river's bed and the formation of a deep and narrow gorge (See RIVER) below the Falls, through which the water rushes at high speed, in places taking the form of rapids because of the boulders in its bed. About three miles below the Falls the channel makes an abrupt turn to the left; and here the impact of the current against the opposite bank has been such as to wear out a large circular basin and to give rise to a "boiling," seething, eddy known as the Whirlpool. This magnificent maelstrom and the rap-

ids leading to it constitute a scenic feature rivaling the Falls themselves in interest. Below the Whirlpool the channel is not so steep, and at Lewiston the plateau ends in a steep cliff 250 ft. high, known as the Niagara Escarpment, which separates it from the coastal plain on the borders of Lake Ontario. At this escarpment the Falls began, probably with a much smaller quantity of water than they carry today, and during the thousands of years since that time have been gradually working their way backward. The Canadian side is retreating more rapidly than the American, averaging from four to six feet a year. The backward cutting of the rock is made difficult by an underlying rock stratum of hard limestone 80 ft. thick, which projects like a shelf at the top of the Falls and over which the waters are precipitated. Beneath this rock layer are strata of soft shales and sandstones.

The American Falls are 1060 ft. wide and of comparatively small volume; the Canadian Falls are 1230 ft. across, 3010 ft. if measured on the curve, and on top of the ledge have a depth of 20 ft. The Falls discharge at the rate of 500,000 tons a minute. Three bridges span the river just below the Falls, and on each side of the gorge an electric trolley facilitates sightseeing for the many visitors. The land on each side of the Falls has been converted into parks, which greatly enhance the beauty of the scenery. The State of New York reserves and controls 107 acres, and the Dominion Government 154 acres, called Queen Victoria Niagara Falls Park. Niagara Falls constitute one of the great scenic attractions of the world. No description of their beauty is adequate, and no conception of their grandeur can be formed until they are seen. See NIAGARA FALLS, N. Y.

**Nibelungenlied,** *Ne' be loong" en leet"*, a celebrated ancient German epic, the story of which belongs to the general body of Germanic and Scandinavian mythology. Of unknown authorship, the poem is thought to have been first written down about 971 to 991 by a wandering minstrel and to have been remodeled by an Austrian knight about 1140. It was originally founded on the story of Sigurd in the *Elder Edda,* additions having been made from time to time. The events are represented as occurring about 430. The principal characters are Siegfried, King of the Nibelungs, in Nether Germany; Gunther, King of Burgundy, and his sister Chriemhild; and Brunhild, a heroine of the fabulous North. Siegfried was asked by Gunther to aid him in winning Brunhild to be his wife. Brunhild, who was to marry only a man who could conquer her, was won by the aid of a magic cloak, and Siegfried was rewarded by the hand of Chriemhild. Several years later in a quarrel between Chriemhild and Brunhild, the former boasted that it was her husband whose strength had conquered Brunhild. Thereupon Brunhild persuaded Hagen, a vassal of Gunther, to put Siegfried to death.

After a period of mourning, Chriemhild married Etzel, King of the Huns. In the meantime, the treasure of the Nibelungs, which had belonged to Siegfried, and which carried with it a curse for the possessor, had been seized and thrown into the Rhine by Hagen. In course of time Chriemhild invited her brother and Brunhild to visit her, planning to avenge the death of her first husband. A combat arose between the followers of Gunther and Etzel, and all of Gunther's people were slain. Chriemhild herself killed Gunther and Hagen, on the latter's refusal to tell where the stolen treasure was buried. Hildebrand, a vassal of Etzel, killed Chriemhild.

The language of the poem is simple but dignified, and it possesses great poetic beauty and dramatic power, ranking among the great epics of literature. Siegfried, Chriemhild and Gunther correspond respectively to Sigurd, Grimhild and Gunnar of the Norse legend. The *Nibelungenlied* has been the subject of many critical studies, and its story forms the basis of Wagner's musical drama *Ring des Nibelungen.* There are several English versions.

**Nicæa,** *Ni se' a,* or **Nice,** *Nees,* **Councils of,** two councils of the Christian Church, held at Nicæa in Bithynia. The first was convened in 325 by the Emperor Constantine for the purpose of harmonizing the existing differences in the Church, especially with respect to the views of Arius. The Arian theory was that Christ was the highest created being, but was not of the same essence as God the Father. This council decisively condemned this doctrine and adopted a confession of faith which asserted that both Father and Son are of the same essence. The council also settled the controversy concerning the time for observing Easter, favoring the Sunday following the day observed by the Jews, which was the 14th of the month Nisan. The second Council of Nicæa was convened in 786 by the Empress Irene and her son Constantine, and reassembled the following year. The occasion of the council was the imperial decree forbidding the use of images in religious services (See Iconoclasts). The council upheld the orthodox views as to image worship.

**Nicaragua,** *Nik" a rah' gwa.* See Central America.

**Nicaragua Canal.** See Panama Canal.

**Nicaragua, Lake,** a large lake in the State of Nicaragua, Central America. It is 100 m. long and its greatest breadth is 45 m. It is only 13 m. from the Pacific Ocean and is about 100 ft. above sea level. The lake contains a number of volcanic islands, two of which have peaks rising to the height of 5000 ft. The lake is drained by the San Juan River, which flows into the Caribbean Sea. This lake was to have formed an important section of the projected Nicaragua Canal. See Panama Canal.

**Nice,** *Nees,* a city of France, situated on the Mediterranean, 84 m. s.e. of Toulon and on a beautiful plain at the foot of the Maritime Alps, which enclose the city on the north and east so as to form an amphitheater. The city is divided by the Paillon River into the old town on the east and the new town on the west. In the old town the streets are narrow and crooked. The new town contains numerous public squares and boulevards and handsome public and private buildings. The industries include the manufacture of silk and cotton goods, paper, oil, leather, soap, straw hats, wines and numerous other articles. The city has an extensive trade in Southern fruits and cultivated flowers. Nice was formerly a city of Italy, but was ceded to France by Victor Emmanuel in 1860. Population in 1911, 142,940.

**Nicene,** *Ni seen',* **Creed,** the most important ancient formula of the Christian Church. This creed asserts that both the Son and the Father are of the same essence, a doctrine which was definitely confirmed at the famous Council of Nicæa (325). The text of the creed was based on the creed of Eusebius of Cæsarea, and was drawn up to combat Arianism, or the doctrine that Christ is not of the same essence as the Father (See Arius). The doctrinal teaching of the Nicene Creed is generally accepted by Christian churches.

**Nicholas I** (1796-1855), Emperor of Russia, was born in St. Petersburg. He received special education in economics and military science. The death of Alexander I in 1825 and the renunciation by his elder brother of his claims to the throne made Nicholas emperor. He began his reign by instituting some reforms, but soon changed his views and adopted an extremely reactionary policy. One of the greatest measures of his reign was the codification of the laws of Russia, begun in 1827 and completed in 1846. As the result of a war with Persia, Russia gained Armenia, and a war with Turkey gave Russia further increase of territory and free navigation of the Danube. The Kingdom of Poland was made a Russian province, and throughout Russia the tendencies towards Western civilization were gradually stamped out. In 1853 Nicholas brought on another war with Turkey, and this led to the Crimean War (See Crimean War). Nicholas died while this war was in progress.

**Nicholas II** (1868- ), Emperor of Russia, born in St. Petersburg. He supplemented his collegiate education by extensive travels through Europe and the East and then made a thorough inspection of the Russian empire. At the death of his father, Alexander II, in 1894, Nicholas became "Czar of all the Russias." He secured the assistance of the ablest Russian statesmen, and during the first ten years of his reign was successful in unifying the interests of his vast dominions. The Trans-Siberian Railway was built, and Russian influence in the Far East was strengthened and internal conditions were improved. But the attitude of Russia toward Japan brought on the Russo-Japanese War, which weakened Russia's position among the great powers. The most significant measure during his reign was the granting by Nicholas of a national legislative assembly, though its powers are greatly restricted. He is a strong advocate of peace and has taken an active part in calling the peace conferences at The Hague. See DUMA; RUSSO-JAPANESE WAR; RUSSIA, subhead *History*.

**Nicholas, Saint,** a popular saint of the Roman Catholic Church, greatly revered because of the many miracles he is said to have performed. His date is uncertain, but must have been prior to the reign of Justinian, as in that ruler's time there were several churches in Constantinople dedicated to St. Nicholas. From early times the people of Germany and England celebrated in his honor, and his feast, occurring on the sixth day of December, became associated with the festival of Christmas. He thus came to be regarded as the patron saint of Christmas, and is now identified with the friend of good children, Santa Claus.

**Nichols,** *Nik' uls,* **Ernest Fox** (1869- ), an American educator, born at Leavenworth, Kan. He graduated at the Kansas Agricultural College in 1888, and subsequently pursued graduate courses at Cornell, Berlin and Cambridge universities. He was professor of physics at Colgate University from 1892 to 1898, and then at Dartmouth College for five years. From 1903 to 1909 he was professor of physics in Columbia University, retiring to accept the presidency of Dartmouth. He is a member of numerous scientific societies, and a contributor to various technical journals.

**Nicias** ( ?-413 B. C.), an Athenian statesman and general. He was a political rival of Cleon, and of Alcibiades. He fought with success against the Spartans and Corinthians, and overran and devastated several districts, including Cythera and Laconia. In 421 B. C. he was instrumental in securing peace between Sparta and Athens, called the Peace of Nicias. In the fall of 415 B. C. he laid siege to Syracuse, although he was opposed to this expedition. After a brief success he was defeated, his fleet destroyed and he himself captured and slain, in 413 B. C.

**Nickel,** a silvery metal found in meteoric iron and in ores of sulphur and arsenic in mines of Ontario, eastern Canada and some islands of the southern Pacific. On account of the slowness with which it oxidizes, it is of great use in plating. German silver is an alloy of nickel and brass, and nickel coins are three-fourths copper and one-fourth nickel; nickel steel, which has only three per cent of nickel, is an alloy of steel of exceptional strength. Nickel coins have been in use in this country for over 50 years.

**Niebuhr,** *Ne' boor,* **Barthold Georg** (1776-1831), a German statesman and historian, born at Copenhagen. He studied at Kiel, London and Edinburgh, and held a position under the Danish Government, which he resigned in 1806 to enter the service of Prussia. In 1810 he was made royal historian and during that year and the two following he delivered lectures on Roman history in the New University of Berlin. These lectures were afterward published in two volumes. From 1816 to 1823 he represented Prussia at the papal court. During this time he did critical and original work on Roman history, resulting in *The History of Rome Down to the First Punic War,* a work of particular

value because it was the first history of Rome that was ever prepared by the critical method that distinguished between legend and history. He died at Bonn, Prussia.

**Niehaus,** *Ne' hous,* **Charles Henry** (1855- ), an American sculptor of German parentage, born at Cincinnati. In his native city he studied at the McMicken School of Design, and afterwards in Munich, where his *Fleeting Time* won a first prize. He returned to America in 1881, and made a number of portrait statues of Americans. In the Connecticut State House are his statues of Hooker and Davenport; in the Congressional Library are statues of Moses and Gibbons; and at Richmond is a portrait statue of Lee.

**Niger,** *Ni' jer,* the third largest river of Africa. Its name among the natives is variously that of Joliba, Kwara, Issa and Mayo. It rises in the Sierra Leone, flows northeast, east and southeast and empties into the Gulf of Guinea through a wide estuary. Its total length is about 2600 m. and the area of its estuary is 14,000 sq. m. The course of the river is over gently sloping ground, and in the desert regions which it crosses, vegetation is found only along its banks. Its delta begins about 80 m. from the sea and consists principally of malarial swamps. Among the towns along the banks are Bamaku, Sego-Sikaro, Timbuktu, Gogo, Birni, Rabba and Lakoja.

**Night'hawk",** a bird of the Goatsucker Family, about the size of the robin. It may be known by its large head, short bill and very wide mouth gape, very long and pointed wings and short, weak feet, the front toes of which are connected by a web. The upper parts are black, mottled with gray; the under parts are white, black-barred; the wing has a white or buff-colored bar; the tail has a broad band; and the throat is white, bordered below by a black patch. The two eggs are laid on the bare ground in more or less exposed places and are spotted with black, brownish or gray and lavender. The nighthawk may be seen in the evening flying in a zigzag manner as it searches for night-flying insects, which it easily catches on the wing owing to the wide gape of the mouth and the presence of the mouth bristles.

**Night Heron,** a night-feeding bird of the Heron Family. The black-crowned night heron is about two feet long and is easily known by its black head and back, white forehead and throat, grayish wings and tail, and light gray sides and under parts. In the spring there are several long white plumes extending from the back of the crown. The nest is a rough platform of sticks placed in bushes or low trees or on the ground, and contains three to six bluish eggs. When disturbed or when flying they utter a gutteral "squawk." The night heron ranges from Canada south over most of South America. A related species, the yellow-crowned night heron, is bluish-gray, with black and gray stripes on wings and back; it is black on the chin and sides of neck, and has a yĕllowish-white crown.

NIGHTINGALE

**Night'ingale,** a bird of the Kinglet Family. It is smaller than the robin (six inches), and is reddish-brown above and whitish or grayish below. The nest is large, and is composed of dead leaves and grasses and lined with grass, rootlets and hair. It is placed in a dense

hedge or thicket near the ground, and four to six olive-brown eggs are laid. The nightingale is a valuable bird to the agriculturist, feeding largely upon insect larvæ. It is found throughout Europe and extends to northern Africa and western Asia. The nightingale of Persia is thought to be the "bulbul" of the poets. Its beautiful song is heard more often at night than in the daytime.

And hark! The nightingale begins its song,—
Most musical, most melancholy bird.
A melancholy bird? Oh, idle thought.
In nature there is nothing melancholy.
....."Tis the merry nightingale
That crowds, and hurries, and precipitates
With fast, thick warble his delicious notes.
—*Coleridge.*

**Nightingale, Florence** (1820-1910), an English philanthropist, best known for her work as an army nurse. Early becoming interested in hospital work, she visited various hospitals of Europe, and was trained as a nurse by the Sisters of St. Vincent de Paul in Paris, and by the Protestant Sisters of Mercy at Kaiserswerth, on the Rhine. At the outbreak of the Crimean War, in 1854, she organized a band of nurses and established the great hospital at Skutari, in the Crimea. Her efforts here revolutionized army nursing, but her health failed because of overwork. At the close of the war she was received in England with great enthusiasm, and was presented by the British people with $250,000, with which she established at St. Thomas Hospital, London, the Nightingale Home for the training of nurses. For several years she superintended this school, but in the eighties she retired from active life, meanwhile, however, during the Civil and the Franco-German wars, giving valuable advice regarding field and camp hospitals. She never married. Among her friends were Lord Salisbury, Gladstone, Henry Ward Beecher and Canon Farrar. In 1907 she received the Order of Merit, being the first woman so honored, and in 1908 she received the freedom of the city of London, being the second woman to whom this distinction was accorded. Miss Nightingale wrote *Notes on Hospitals, Notes on Nursing* and *Life or Death in India.*

**Night'shade",** a family of herbs including the eggplant, horse-nettle, potato, bittersweet and common nightshade. The latter is a low, much-branched weed, not prickly, as many members of this family are. The leaves, which are smooth and oval in shape, with wavy or toothed margins, have a peculiar arrangement due to a lengthening of the stems which bear the flower clusters. The leaves are carried up on the stem and form a cluster with the bracts, or leaflets which surround the flower. The flowers are small and white with five or more divisions. The fruit is a small blue-black berry, which is more than half surrounded by the calyx.

**Ni'hilism,** a general term used to define a Russian socialistic movement. In Russia the word *nihilist* was first applied by Turgeniev to the hero of his novel *Fathers and Sons.* The Nihilist Party began its liberal agitation about 1818, and during the reign of Alexander III adopted a program of positive reform, the object being to destroy all forms of government and annihilate all class distinctions. In the early part of 1870 a socialistic propaganda was spread among the serfs by many young people of the upper classes, who voluntarily distributed socialistic literature, but in 1874 the Russian Government began to interfere; the newspapers which advocated the Nihilist doctrine were suppressed and large numbers of the revolutionists were tried and condemned to death or Siberian exile. Thereafter the Nihilists adopted a more secret policy, but within recent years the police discoveries show that Nihilism is spreading and secret affiliations are known to exist between its adherents in Russia and those in other countries.

**Nile,** the largest river of Africa, and next to the Missouri-Mississippi, the longest in the world. It extends from Victoria Nyanza to the Mediterranean Sea, a distance of 3670 m. There are four parts, the Upper, Middle and Lower Nile and the Delta. The Nile

flows out of Victoria Nyanza, and its course is alternately peaceful and interrupted by falls and rapids until it reaches the Albert Nyanza, from which it emerges at the northern end and continues its course as the Bahr-el-Jebel, receiving several tributaries. At Khartum it receives the Bahr-el-Azrak, or Blue Nile, and 180 m. below the confluence, the waters of the Atbara fall into it. After this point it flows in a remarkable course of 1800 m., without being joined by a tributary, is lost here and there in the swamps and grasslands, and continues through a valley or cleft in the desert plateau, the sides of which often rise to a height of over 1000 ft.

The rainfall in the highlands of Abyssinia determines the supply of water in the Nile, its rise and fall, and, in turn, the change of seasons. The heavy rains begin in April, and the floods descend upon Cairo about June 15. Two or three weeks later the amount increases rapidly, even to the rate of three feet per day, and continues until October and later. These annual inundations account for the existence of Egypt in history, for they have the distinction of having turned the land from a desert into a rich agricultural region, and have established the security of farming by reason of the loamy soil deposits which they carry. Attempts have recently been made to store this abundant water supply, and an efficient system of irrigation is now maintained (See IRRIGATION). One of the great obstacles to navigation of the Nile, principally between Khartum and Gondokoro, is the heavy vegetation growth, known as sudd, on the surface of the stream. The masses of weed grow so insistently deep and strong that in places they have been found able to support the weight of the hippopotamus. The Cape-to-Cairo Railway, with its connections, cuts its way through this part of the continent chiefly along the Valley of the Nile.

**Niles, Ohio,** a city of Trumbull Co., 5 m. s.e. of Warren and 58 m. s.e. of Cleveland, on the Mahoning River at the mouth of the Mosquito Creek, and on the Pennsylvania, the Erie and the Baltimore & Ohio railroads. Niles is primarily a manufacturing center, but its prosperity is partially derived from operations in iron and bituminous coal, which are mined in the vicinity. There are rolling mills, blast furnaces, boiler works, tin-plate mills, steam- and electric-car shops, galvanized-iron shops and manufactories of printing presses, fire brick, incandescent lamps, chinaware and iron-foundry products. The town was incorporated in 1864 and chartered as a city in 1895. Population in 1910, 8361.

**Ninebark,** *Nine' bark",* a common, ornamental shrub of the Rose Family, found in western United States growing along the banks of streams or bending over country roads. The stem is smooth, with slender curving branches and leaves almost as long as broad. These leaves are often cut into three or five blunt lobes and are long-stemmed. Their edges are finely-toothed and their color is bright green. The flowers grow in rounded clusters nearly three inches across. They are white or purple-tinted in color and are generally in bloom the last of June. The individual flowers are small, with a five-lobed, bell-shaped calyx and five rounding petals. The fruit is a smooth, dark-colored pod containing two seeds. The name ninebark was given because of the way in which the layers of the bark peel. In the South a shrub of the Saxifrage Family is called ninebark.

**Nin'eveh,** the ancient capital of the Assyrian Empire, situated on the Tigris River opposite the present town of Mosul. About 606 B. C. Nineveh was captured and destroyed by the Medes and Babylonians. The site of the city long remained unknown. In 1842 Botta began excavations on the supposed site of the left bank of the river, where great mounds indicated buried mines. He was followed by Layard and others. The excavations brought to light ruins of palaces, numerous sculptures, a royal library, innumerable small objects and elaborate walls. The British Museum contains many of the relics.

**Ning'po',** a seaport of east-central China open by treaty to foreign commerce and of importance for its exports of tea, drugs, silk, raw cotton and mats. It has many interesting buildings, including the great library, temples, cloisters and schools. There are manufactories of gold and silver articles, silks, confectionery, lacquered ware and carved wood. The population is estimated at 400,000.

**Niobe,** *Ni' o be,* in Greek myths, daughter of Tantalus and wife of King Amphion of Thebes, by whom she had

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seven sons and seven daughters. For boasting of her progeny to Latona, who had but Apollo and Diana, all her children were killed. In an excess of grief, Niobe was changed into a stone, from which her tears, in a trickling stream, ever flowed.

*Niobe and Her Children,* a masterpiece in statuary, is in the imperial gallery of Florence.

**Nip'igon, Lake,** a body of water situated in the northwestern part of Ontario, Canada, about 30 m. n. of Lake Superior. It is about 70 m. long and about 40 m. wide and has a very rocky and irregular coast line. The lake is deep, and contains over 1000 wooded islands. Several small streams feed it, and the outlet is through the Nipigon River into Lake Superior. It is noted for its scenery.

**Nip'issing, Lake,** a lake situated in Ontario, Canada, about midway between Lake Huron and the Ottawa River and northeast of Georgian Bay. It is about 55 m. long and about 20 m. wide, but the shores are very irregular. The lake contains numerous islands, some of which are inhabited by Indians. It is fed by the Sturgeon River, and the French River is the outlet. The lake was first visited by Le Caron, a Récollet priest, in 1614, and was a favorite meeting place for the French fur traders and the Indians during the early period of Canadian history.

**Ni'san,** in the Jewish calendar the first month of the sacred year and the seventh of the civil year. It answers nearly to our March. The original name was Abib, but after the Captivity it received its present name.

**Ni'ter.** See SALTPETER.

**Ni'ton,** a newly-discovered element which is found in the waters of many springs and is said to give them curative properties. It is one of the so-called emanations from radium and is the gas which remains after the helium particles have broken away from radium. The rate of disintegration is very slow, and after 1760 years one ounce of radium will have changed into half an ounce of helium and niton, leaving one-half ounce pure radium. After another 1760 years a quarter of an ounce of the remaining radium will have changed, while one-quarter of an ounce still remains radium. So the process continues in a never-ending period of decay. Niton, like oth-

ers of this group, helium and argon, is an inactive element which forms compounds with no other elements. Its own existence is less than four days, when it in turn changes to another substance. Niton can be solidified into an invisible icelike stick whose presence is made known only by the brilliant light which it gives. Liquid nitron gives a beautiful violet light, although, seen itself, it is a colorless liquid. Sir William Ramsay, the discoverer of niton, claims that 75 per cent of the curative properties of radium are due to the presence of niton.

**Ni'tric Acid,** or **Aqua Fortis,** *A' kwa For' tis,* an acid well known since the time of the alchemists. Its constituents were not known, however, until discovered by Cavendish and Lavoisier in the latter part of the 18th century. Nitric acid is a fuming, colorless liquid having a penetrating odor and such strength that it causes severe skin wounds when concentrated and even if diluted stains the skin yellow. It gives up its oxygen so readily that sawdust and similar substances ignite if brought into contact with it. Nitric acid is prepared commercially by the mixture of potassium or sodium nitrate and sulphuric acid, in cast-iron vats lined with fire brick and built into the furnace so that they may have uniform heat. The resulting fumes are passed through a tower filled with charcoal through which water is constantly trickling; this absorbs the peroxide of nitrogen which would otherwise escape. The acid is also produced in small quantities in the decay of animal or vegetable matter which contains nitrogen, or in the passage of the electric spark through moist air.

When hydrochloric and nitric acids are mixed, a solution called aqua regia is obtained; this combination of acids dissolves gold, platinum and other substances not acted upon by either acid alone. Its name, meaning royal liquid, was given by the alchemists because of its ability to dissolve the royal metal, gold.

**Nitrobenzol,** *Ni" tro ben' zole,* or **Ni"troben'zene,** a nitrogen compound manufactured from benzene, one of the lighter oils of coal tar. It is a yellow, oily liquid having a sweet taste and a suffocating odor. Nitrobenzol is highly poisonous, and the inhalation of its vapors may cause death. It is insoluble in water, but easily soluble in alcohol and ether. Commercially, it is a constituent of many perfumes, but its chief use is in the production of aniline for dyeing purposes.

Nitrobenzol is prepared by mixing benzene, sulphuric acid and nitric acid slowly in a large iron tank where the temperature can be kept low until they are thoroughly mixed, after which the mixture is heated to about 80° C. The resulting compound is then diluted and the nitrobenzol distilled off. To render it perfectly pure, a process of drying and purification is also necessary.

**Nitrogen,** *Ni' tro jen,* a colorless gas discovered by Rutherford in 1772 and formerly called azote. It is considered inactive, though it acts readily upon tungsten, magnesium and titanium, causing them to become incandescent. Fully four-fifths of the air by volume is nitrogen, and there it acts as a weakener of the oxygen, which would otherwise be too active. Nitrogen is not a supporter of respiration or combustion; thus it suffocates animals confined in it, though it is not a poison.

With hydrogen, nitrogen forms the common gas ammonium; its chief acid, nitric acid, which was known to the alchemists, in the ninth century, is well known for its corroding power on most substances. Potassium nitrate, called saltpeter, and sodium nitrate, Chile saltpeter, the principal salts of this acid, are used in making gunpowder. Many nitrogen compounds, especially Chile saltpeter, are of great value as fertilizers since all plants require much nitrogen to build up their tissues. The saltpeter beds are so rapidly becoming exhausted that experiments are being made by the bureau of manufactures in the Federal Department of Agriculture to transform the plentiful nitrogen of the atmosphere into a form suitable for use. As the at-

mospheric nitrogen over one square mile of land is 22,000 tons, the supply from this source is practically inexhaustible. In Norway a process of extracting the atmospheric nitrogen by means of electric furnaces is already in use, but though the product rivals the Chile saltpeter, the furnaces are as yet not wholly efficient. See NITRIC ACID; SALTPETER; AMMONIA; FERTILIZER.

**Nitroglycerin,** *Ni" tro glis' er in,* or **Glonoin,** *Glon' o in,* an explosive substance consisting of a mixture of sulphuric and nitric acids and glycerin. It is an oily liquid without odor or color. It is made by pouring the glycerin into the mixture of acids and stirring the mass and cooling it by cold water during the operation. When brought in contact with a red-hot iron or an electric spark, or violently jarred, nitroglycerin explodes with a force 13 times as great as that of gunpowder. In its liquid state it is very dangerous to handle and especially to transport; hence it is usually made at the place where needed for immediate use. Mixed with clay it forms dynamite and cordite. In its pure state it is used for blasting under water and loosening the earth around the base of oil wells to increase the flow of petroleum. It is also employed to some extent in the manufacture of smokeless powder. See BLASTING; DYNAMITE; SMOKELESS POWDER.

**Nizhni-Novgorod,** *Nyez' nye-Nov' go rot,* a town of Russia, capital of the government of the same name, situated at the confluence of the Oka and Volga rivers, 272 m. by rail e. of Moscow. The town consists of three parts: the upper, including the citadel; the lower and the fair grounds. Among the chief buildings are monasteries, old churches, a military school, a technical school and a theological seminary. The Kremlin, or old fort, commands a striking outlook over the Volga. The annual fair, held from July 29 to Sept. 10, was instituted in 1817. It exercises a wide influence on prices of goods and on the trade in Russia, Siberia and Turkestan. The shops used for the fair number about 8000. As early as 1221, a fort was established on the present site of the town. The death rate in the city exceeds the birth rate; at the time of the fair the visitors equal in numbers the regular inhabitants. Population, about 95,000.

**No'ah,** a patriarch of the Old Testament, son of Lamech. The book of *Genesis* records his being chosen by God to be the father of the new race which would dwell on earth after the Deluge. Being warned of the coming flood and under direction of the Divine Spirit, he built a great Ark, within which he and his family, and all manner of animals, took refuge. When the waters had subsided, the Ark rested on Mt. Ararat, where Noah was assured that the earth would never again be destroyed by water, a rainbow in the clouds being given as a sign of this promise. Noah's three sons, Ham, Shem and Japheth, according to Scripture, became the progenitors of the three great branches of the human race after the flood.

**Nobel' Prizes,** the prizes left in 1896 by the will of Albert Nobel, the Swedish inventor of dynamite. Nobel left an estate of about $9,000,000, the interest of which is divided yearly among five recipients of prizes, in the following manner: Award is made (1) for the most important discovery or invention in physics; (2) the most important discovery or improvement in chemistry; (3) the most important discovery in physiology or medicine; (4) for the most idealistic work in literature; (5) for the best work in the promotion of universal peace.

The first and second prizes are awarded by the Royal Academy of Science in Stockholm, the third by the Caroline Medical-Chirurgical (surgical) Institute in Stockholm, the fourth by the Swedish Academy in Stockholm and the fifth by the Norwegian Storthing (Parliament). Every candidate must be proposed by writing, by some duly qualified person, and every literary work must have appeared in print. The prizes are announced on Dec. 10 following the award, and a diploma and gold medal

are given with the prize. Within the following six months it is expected that the winners of the first four prizes will lecture at Stockholm upon the subject for which the prize is given. The lecture for the peace prize is given at Christmas. The prizes average $40,000. Among Americans, Theodore Roosevelt was awarded the peace prize in 1906; Senator Elihu Root received the peace prize for 1912; Prof. Albert A. Michelson was awarded a prize in 1907 for his valuable discoveries in physics. Dr. Alexis Carrel, a native of France, but a resident of the United States, was awarded the prize for medicine in 1912.

Up to 1912 three women had been recipients of prizes. One was awarded to Madame Curie for researches in physics, in 1903, and one for researches in chemistry, in 1911; one to Selma Lagerlöf, in 1909, for idealistic work in literature; and one to Bertha von Suttner, in 1905, for the promotion of peace. Writers of world-wide reputation winning the prize for literature include Theodor Mommsen, the historian; Björnstjerne Björnson, the Norwegian writer; Henryk Sienkiewicz, the Polish novelist; Rudyard Kipling; Maurice Maeterlinck, the Belgian writer; and Gerhart Hauptmann, the German poet, dramatist and novelist.

**Nod'dy,** a sea bird of the Tern Family, living on tropical coasts from Florida to Brazil. It is 16 inches long and in color it is blackish-brown, with a whitish head; the tail and the wings are long and the feet webbed. The nest is made of sticks and is usually placed in mangrove trees. The eggs have reddish-brown markings and are sought as food in the West Indies. This bird, like the booby, is stupid and allows itself to be picked up without flying.

**Nogi,** *No' ge,* **Kiten,** Baron (1849-1912), a Japanese general and statesman. He belonged to the Samurai caste of feudal Japan, and fought the Latsuma Rebellion. Following the Japanese-Chinese War of 1895, he became governor of Formosa, in which capacity he distinguished himself, and in the war between Russia and Japan conducted the siege of Port Arthur from May, 1904, until the following January. He then joined Oyama, and was conspicuous at Mukden (See Russo-Japanese War). With his wife, Count Nogi committed suicide in September, 1912, out of respect to his dead ruler, Emperor Mutsuhito.

**Non - Importation Agreement,** in American history, a compact entered into by merchants of New York and Boston, in 1765, in which they pledged themselves to order no new goods from England and to cancel old orders. This was among the first acts of retaliation for the Townshend Acts, and it came soon after the Stamp Act. Virginia next adopted resolutions in support of non-importation and other colonies soon followed her example. As a result of this policy, exportations to New England and the Middle colonies alone were reduced two-thirds of their previous value in one year, while the total exportations from England fell off one-half. The agreement was strictly observed until 1770, when all duties save that on tea were repealed, and only tea was prohibited. See Stamp Act; Townshend Acts; Revolutionary War in America.

**Non-In'tercourse Act,** in American history, an act of Congress passed in February, 1809, and signed by Jefferson on March 1. As a substitute for the Non-Importation Act and the embargo, it went into effect March 15, on which day American vessels could once again engage in a limited foreign trade, but were still under bonds not to have any commercial intercourse with France or England or their dependencies. The act was revived June 28, 1809, May 1, 1810, and March 2, 1811. See Embargo Act; War of 1812.

**Nordenskjöld,** *No" ren shul',* **Nils Adolf Eric,** Baron (1832-1901), a Swedish naturalist and Arctic explorer, born in Finland. Soon after receiving his master's and doctor's degrees from the University of Helsingfors in 1857, he became curator of the mineralogical department of the Swedish Royal Mu-

seum in Stockholm. He took part in all subsequent Arctic expeditions sent out by the Swedish Government, seven of which he led. In 1870 he explored Greenland, and some five years later he headed two expeditions across the Kara Sea and up the Yenisei River. Leaving Sweden in June, 1878, he successfully made the Northeast Passage and wintered in the ice near Bering Strait, reaching Yokohama in September, 1879. He returned to Sweden by way of the Suez Canal, thus being the first to circumnavigate the Continent of Eurasia. See POLAR EXPLORATIONS.

**Nor'dica, Lillian** (1859-1914), an American singer whose maiden name was Lillian Norton, was born in Maine. She studied in America and later in Milan, making her operatic début at Brescia in *La Traviata* under the assumed name Nordica. She attained fame in Italian rôles but achieved her greatest success in difficult parts of Wagner opera. She returned to the United States in 1895, and at once won recognition as one of the leading sopranos of her time.

**Norfolk,** *Nor' fok,* **Va.,** an independent city of Norfolk Co. and a port of entry, situated in southeastern Virginia 8 m. from the mouth of the Elizabeth River, on the Albermarle and Chesapeake and the Dismal Swamp canals. It lies 90 m. s.e. of Richmond and is on the Atlantic Coast Line, the Seaboard Air Line, the Southern, the New York, Philadelphia & Norfolk, the Chesapeake & Ohio, the Norfolk & Western, the Norfolk & Southern, the Virginian and other railways, and is served by six foreign steamship lines and by ferries connecting it with Portsmouth, Newport News, Old Point Comfort and Hampton. Many electric lines extend to near-by points of interest and to adjacent cities, and supply the city with excellent street-car service. The city has about 160 m. of streets, nearly half of which have been paved and put into fine condition. In general, they are well shaded, and the homes which lie along them have well-kept lawns and trim curbs. There is a large city park of 114 acres and several smaller parks, all attractive in appearance. Not far from the city are many delightful summer resorts, such as Virginia Beach, Ocean View, Old Point Comfort, Pine Beach, Willoughby Beach and Cape Henry. Beautiful drives to most of these and to other points of interest add to the city's charms.

The noteworthy buildings of the city include the city hall, the custom-house, the Federal Building, the cotton exchange, a large city market and a well-stocked public library. There are several hospitals, including St. Vincent's, St. Christopher's, the Naval, the Sara Leigh and the Norfolk Protestant; and excellent churches, among which is historic St. Paul's, built in 1737 and having in its churchyard one of the oldest cemeteries of the United States. Aside from the public schools, with the fine new high school building, Norfolk is the seat of the Norfolk Mission College, St. Joseph's Colored School and Norfolk Academy. Norfolk is the largest coaling station in the United States, and its immense coal docks are crowded with traffic. It is also a shipping point for lumber, garden truck, fish and oysters, besides being the largest peanut market of the world. Its importance as a port has aided in making it a manufacturing city as well. There are fully 350 manufacturing plants, including the extensive ones connected with the peanut industry. The city is third in the state in the value of its manufactured products.

Norfolk was founded in 1682 by act of the Virginia Assembly, which recognized its site as a remarkable one for purposes of trade and commerce. It became a city in 1845, and its present charter was given in 1906. In government it is wholly independent of Norfolk County, of which it is geographically a part. During the Revolutionary War, Norfolk was partially burned by its citizens to prevent its occupation by the British. In the Civil War it was abandoned by the Federal troops, who in 1861 burned the navy yards and then left it to the Confederate forces. De-

fending the harbor are Fortress Monroe and Ft. Wool, the first a historic fort of the Civil War (See FORTRESS MONROE). A few miles from the city lie the ruins of Jamestown, the first permanent English settlement in America. Population in 1910, 67,452.

**Normal School,** a school especially designed for the professional training of teachers. As the term is ordinarily used, it means a school for training teachers for elementary schools. Those institutions which prepare teachers for more advanced grades of work are styled teachers' colleges or schools of education.

Normal schools had their origin in Germany, where the first successful one was established at Rhiems in 1681. In the early part of the 18th century normal schools were to be found in Prussia and France. They were introduced into the United States through Horace Mann, who, when secretary of the Massachusetts Board of Education, induced the Legislature of that state to appropriate $10,000 for the purpose. This was supplemented by the gift of an equal sum from individuals who were interested in the movement. The first school was established at Lexington in 1839, and the following year others were established at Westfield and Bridgewater. New York followed Massachusetts and established a normal school at Albany which has since become the Albany Normal College. The success of these early schools was such that others soon followed, and by 1860 normal schools had become recognized as a part of the educational system of nearly every state in the Union. Most of these schools are state institutions, deriving their support entirely from the state and being managed by state boards. Tuition is free, but some schools collect a small fee for incidentals. The course of study is prescribed by the faculty usually in consultation with the board of control and the state superintendent of public instruction. Requirements for admission are usually fixed by legislation. In some states the diploma is a teacher's certificate, which allows the holder to teach in the public schools without further examination. In other states the graduates of normal schools must pass the required examination to procure a certificate. There are only a few private normal schools in the United States.

**Nor'mandy,** an ancient province in the northern part of France, bordering on the English Channel. It is now divided into the departments of Seine-Inférieure, Eure, Orne, Calvados and La Manche. The capital was formerly Rouen; other important towns within its borders are Dieppe, Havre, Harfleur, Yvetot, Caen and Cherbourg. The Franks seized the territory after the Roman power declined, and it received its name when it fell into the hands of the Norse invaders, under the leadership of Hrolf, or Rollo. In 1035 William II became Duke of Normandy; after he established a Norman dynasty on the English throne in 1066, Normandy was annexed to that country. While ruled by his son, after William's death, it was separated from England, was reunited to it under Henry I in 1106, and was conquered by Philip Augustus of France in 1203. Several times retaken by the English, it became a permanent possession of France in 1449, and now represents one of the most productive parts of that country.

**Nor'mans,** the name applied to those colonists from Scandinavia who settled that part of France which was called, after them, Normandy. Originally called Northmen, they began to make piratical expeditions to the coasts of Gaul before the end of the reign of Charlemagne, and by 845 they had ascended the Seine and sacked Paris. In 912 the Carolingian ruler, Charles the Simple, granted Rollo, the leader of the Northmen who had settled at Rouen, possession of all the land in the Seine Valley from the Epte and Eure to the sea. Henceforth this region went by the name of Normandy, and the name Northman became softened into Norman. The Normans readily adopted the religion, manners and speech of the inhabitants of their new country, and in the 12th century de-

veloped a school of narrative poetry (See TROUVÈRE). The old Norse spirit of adventure, however, never became extinct, and in the 11th century many Norman nobles and their followers sought an outlet for their warlike instincts in southern Italy. Robert Guiscard was in 1059 recognized by Pope Nicholas II as Duke of Apulia and Calabria, and his brother Roger conquered Sicily. The Normans of Italy were also prominent in the Crusades. The most important enterprise of all was the Norman Conquest of England in 1066, when William the Conqueror established a new dynasty in that country.

**Nor'ris, Frank** (1870-1902), an American novelist, born in Chicago, Ill. After studying art in Paris from 1887 to 1889, he studied literature at the University of California and at Harvard. In 1891 his first novel, *Yberville,* dealing with Spanish life in Old California, appeared, and eight years later his novel *McTeague* attracted public attention. During the Jameson Raid he was correspondent in South Africa for the San Francisco *Chronicle;* he edited the San Francisco *Wave* in 1896-97 and was war correspondent in Cuba in 1898. Two years later he published *Moran of the Lady Letty.* In 1901 appeared *The Octopus,* the first volume of the trilogy he had planned, which was to be an "epic of the wheat." It was followed by *The Pit,* containing many vivid descriptions of the battles on the exchange. The third volume, *The Wolf,* was outlined, but left incomplete at the time of his death.

**Nor'ristown, Pa.,** a borough and county seat of Montgomery Co., 18 m. n.w. of Philadelphia, on the Schuylkill River at the mouth of Stony Creek, on the Schuylkill Canal and on the Philadelphia & Reading, the Pennsylvania, the Stony Creek and other railroads. The borough is connected by bridges with Bridgeport on the opposite side of the river, where cotton and woolen goods are extensively manufactured. Norristown is delightfully situated and commands fine views of the Schuylkill Valley. The borough is a popular residential suburb for many Philadelphia business men who enjoy the rural environment and city comforts. The main artery in the system of electric railways is the Schuylkill Valley line connecting Philadephia and Pottstown, with connections for Reading, Boyertown, Torresdale and the many intervening towns and villages, which include Conshohocken, Collegeville and Lansdale; also the Philadelphia & Western, from Allentown to Philadelphia. Valley Forge is six miles distant. Norristown, in point of everything save charter, is a city and claims to be the largest borough in the world.

Norristown has many miles of broad and well-paved streets, surrounded by lawns and gardens. There are a number of parks maintained by the borough. Among the noteworthy buildings are the Montgomery County Courthouse, city hall, Federal building, Masonic Temple, a number of banks and municipal buildings. There are about 40 churches. The educational institutions include a high school, public and parish schools, Montgomery Historical Society, the Norristown and McCann public libraries, a business college, Commercial and Motor-Boat clubs and a Chamber of Commerce. The industries of Norristown are represented by carpet, cotton and woolen mills, foundries and machine shops, radiator works, knitting-machine works, screen works, a magnesia factory, patent-medicine laboratories, shirt factories, hosiery mills, broom factories, fiber works, breweries, cigar factories and asbestos works.

Norristown was founded in 1785 and named in honor of Isaac Norris, a friend of William Penn and member of the State Legislature, who had owned the land upon which the borough is built. Norristown was incorporated in 1812. Population in 1910, 27,875.

**North, Christopher.** See WILSON, JOHN.

**North, Frederick,** EARL OF GUILFORD (1732-1792), prime minister of England during the American Revolution. After receiving his education at Eton and Cambridge, he entered the House of

Commons as a Tory at the age of 22. As lord of the treasury he advocated the Stamp Act and the right of England to tax the colonies. He became prime minister and first lord of the treasury in 1770 and remained in office until 1782. As head of the government he managed the war for George III and supported his American policy, but resigned when it failed. During the last five years of his life he was totally blind. He succeeded to the title of Earl of Guilford two years before his death.

**North Adams, Mass.,** a city of Berkshire Co., 36 m. e. of Albany, N. Y., on the Hoosac River near the west end of the Hoosac Tunnel, and on the Boston & Maine and the Boston & Albany branch of the New York Central Railroad. Five miles southwest is Greylock, the highest mountain in the state, and the city is surrounded by the beautiful scenery of the Berkshire Hills. Within the corporate limits of North Adams are the villages of Beaver, Brayton, Greylock and Blackington. The principal industrial establishments are machine shops, cotton and woolen mills and print-goods and boot and shoe factories. There is also a large trade in farm and dairy products. A state normal school is located here and there are many fine public buildings. Population in 1910, 22,019.

**North America,** the third largest in size among the grand divisions of the globe. It lies in the Western Hemisphere and extends from 9° to 70° 26′ north latitude and from 47° 30′ to 168° west longitude. The narrow Isthmus of Panama connects it with South America; Bering Strait separates it from Asia to the northwest.

Size. From north to south its length is about 4500 m.; its greatest breadth from east to west is over 3000 m. The total area is about 8,300,000 sq. m. Like South America, its form is triangular, with the base at the north and the apex at the south. The coast line, however, is different from that of the neighboring grand division to an extraordinary degree. It is extremely irregular, containing large gulfs and inlets and several great peninsulas. The Arctic Ocean bounds the continent on the north; the broken coast of the Atlantic Ocean is on the east; the fairly regular western shore is washed by the Pacific Ocean.

Coast Waters. On the north is Hudson Bay, projecting far inland into the Dominion of Canada. South of it are the Gulf of St. Lawrence and the Bay of Fundy. The Atlantic coast contains Massachusetts Bay, Long Island Sound, Delaware and Chesapeake bays and Albemarle and Pamlico sounds. On the south are the Gulf of Mexico and the Caribbean Sea, together with the gulfs of Campeche, Colon and Honduras. The western coast has few indentations, except the Gulf of California, San Francisco Bay and Puget Sound. The chief peninsulas are those of Labrador, Nova Scotia, Florida, Yucatan, Lower California and Alaska.

Islands. North of the continent is the group of islands known as the Arctic Archipelago, to a great extent, merely frozen wastes of land of no importance. Greenland lies to the northeast, and along the eastern and southern coasts are Newfoundland, the Bermudas, the Bahamas and the West Indies. Queen Charlotte's and the Aleutian Islands are on the west.

Physical Features. The two Americas are similar in relief in so far as the large mountain system, the Cordillera, extends along the western coast of both. In North America a broad valley succeeds this elevation on the east, and is in turn succeeded by the Appalachian range along the eastern coast.

*Highlands.* The western highland system or Cordillera, consists of the Rocky Mountain system, the Cascades, the Sierra Nevada and the Sierra Madre mountains. These ranges and their peaks reach their highest elevations in the states of Colorado and California. The greatest width of the Rocky Mountains is over 1000 m.; the height varies from 3000 to 10,000 ft. (See Rocky Mountains). The Sierra Nevadas extend in part the length of California, and

contain mounts Corcoran, Whitney and Shasta. From the Sierra Nevadas stretches a continuation known as the Cascade Range, extending through Oregon and Washington into British Columbia (See CASCADE RANGE). The mountains of the continent culminate in Alaska in Mt. McKinley, 20,464 ft. high. West of the Cascades is the lower Coast Range extending along the coast through northern California, Oregon and Washington. In Mexico are the alternating table-lands, ranges and peaks of the Sierra Madre Mountains. Here are lofty peaks and active volcanoes, including Popocatepetl, 17,876 ft., Orizaba, 18,250 ft., and Ixtaccihuatl, 16,960 ft. The central part of the continent contains practically no elevations, except those of the Ozark Hills in the south-central part of the United States. The Appalachian system extends from Newfoundland to the State of Alabama. It is so old that many of its lofty elevations have become lowlands through constant wearing away of the mountainous mass. The Allegheny Mountains, in Pennsylvania and Virginia, constitute the central part of the system. The northern group includes the Adirondacks of New York and the Green and White mountains of New Hampshire and Vermont. East of the elevation, where the land slopes gradually to the ocean, is the territory known as the Piedmont Region and the Atlantic Plain. See APPALACHIAN MOUNTAINS; ADIRONDACK MOUNTAINS.

*Lowlands.* The principal lowlands of North America are the Great Plains, stretching from the eastern base of the Rocky Mountains to the western slopes of the Appalachian system. They merge into the coastal plains of the Gulf of Mexico in the South. In Canada are the Laurentian Highlands, with their continuation, the Height of Land. In the Dakotas is an elevation known as the Black Hills, so-called because of the crowning, dark forests. These form practically the only break in the wide extent of the Great Central Plain. Minor stretches of lowlands are found along the coasts.

NORTH AMERICA

*Rivers and Lakes.* The eastern ranges of the Cordillera form the great continental divide. The river systems are the Arctic, the Atlantic, the Gulf, the Pacific and the inland. The Nelson, the Saskatchewan and the Mackenzie are the three great rivers constituting the Arctic system. The St. Lawrence is the principal river emptying into the Atlantic Ocean. Others are the Hudson, the Delaware and the Potomac. The Mississippi drains the Great Central Plain, and receives the water of the Missouri, Red, Ohio and Arkansas rivers. The Sacramento, Columbia, Fraser and the Copper rivers fall into the Pacific Ocean, and in the Arctic region the Yukon flows into Bering Sea. The Rocky Mountain plateau is drained by the Rio Grande and the Colorado, with its magnificent and marvelous canyons.

The lakes of North America are large and numerous. The St. Lawrence system, or Great Lakes, has an area of 90,000 sq. m. (See GREAT LAKES). In Canada are Great Bear, Great Slave, Athabaska, Reindeer, Winnipeg and Manitoba lakes and Lake of the Woods and many others of smaller area. Throughout the northern part of the United States are a great number of small lakes. Yellowstone Lake, in the western part, is of volcanic origin; among those which have no outlet are the Great Salt, Carson and Walker lakes.

GEOLOGY. The geologic history of the continent is fairly simple. The northeastern part, including the Laurentian Highlands of Canada and the Adirondack region of New York, was the first to be elevated above the sea. Within recent geologic times the Laurentian Glacier covered the greater portion of Canada and of the northeastern part of the United States. Vestiges of its action are apparent in the changed course of streams, erosion, deposits of moraine and the formation of numerous lake basins. Among the glaciers which still exist are several of wide extent on the coast of Alaska. The Muir Glacier covers at least 1000 sq. m. North America is rich in mineral deposits. In the east-

ern highlands extensive mining of coal and iron is carried on. Coal is also found in the territory between the Ohio and the Mississippi rivers, as well as in the Rocky Mountain region. Prior to the discovery of gold in South Africa and Australia, no other area yielded so rich a supply as that of the Rocky Mountains. Silver, lead and copper ores also exist. Gold has also been extensively mined along the Pacific coast. In the neighborhood of Lake Superior and northern Lake Michigan are deposits of copper and iron. Other extensive deposits of copper occur in Montana and Arizona. Other products are salt, marble, slate, granite, clay (used for brick), pottery and tile.

Climate. Latitude, relief, prevailing winds and rainfall determine the different climatic regions of North America and account for the wide divergences of temperature. In the extreme northern part only the surface of the ground thaws during the brief summer months, and vegetation is sparse. Northern Alaska and northern Canada are little more than lowland moors. Farther south the western coast grows rapidly milder, due to the ocean vapors and the checking of the polar winds by the Rocky Mountains, while far southward along the eastern coast Arctic climatic conditions prevail. British Columbia enjoys an equable and advantageous climate, while Labrador, in the same latitude, is unbearably cold and practically uninhabited. Through southern Canada and the United States the distinctive climatic features are prevailing westerly winds, which bring about equable climate and an abundance of rainfall on the western coast; and a continental climate between the principal mountain systems, which causes the temperature to shift from extremes of heat and cold, with alternating north and south winds. Central America, due to its narrowness, has an insular climate, and lies within the range of the trade winds. The Gulf region is sufficiently watered, except to the west, where arid territory is found. The Atlantic coast, though not enjoying the uniform climate of the Pacific, has abundant rainfall; the northern part is cold in winter.

Plant Life. In the North are numerous tundra, by reason of the constantly frozen ground; and reindeer moss, dwarfed willows and a few shrubs constitute the total plant life. Marked changes in the forests are apparent as one advances southward, forests of spruce, birch and alder yielding to pine, hemlock and fir, and to the heavily timbered areas of Washington, Oregon and California. In central and eastern United States the species changes to hard wood; in the southern part, chiefly to yellow pine. The plateau regions contain grass, cacti and yucca, but trees are practically unknown. The cactus is wild and picturesque, and furnishes food to cattle on the arid highlands. The prairie regions in the central part of the continent were practically treeless in their natural state, except along river banks, and their heavy growth of grass has yielded in part to plants that thrive under cultivation sometimes with the aid of irrigation. The eastern section has been wooded, and contains rich agricultural areas. In the South, vegetation becomes tropical, and there, as well as in Central America, plant life is profuse.

Animal Life. In part, the fauna of North America is identical with that of corresponding latitudes in the Eastern Hemisphere. Wild animals are still found in central regions. In the North the prevailing species are the polar bear, the fur seal, the walrus, the American reindeer, or caribou, the beaver, the otter and the Arctic fox. The moose and deer haunt the forests of latitudes as far south as northern Maine. The bison formerly so common on the central plains are now practically extinct. Gophers and prairie dogs still exist. The grizzly, black and brown bears, wolf, coati, Rocky Mountain sheep, elk and deer prowl among the Rocky Mountains; in the Appalachian region are found the possum, fox, raccoon, skunk, mink, wild cat, black bear and lynx. Animals peculiar to North America are

the musk ox, the skunk, the puma, the pronghorn and certain Rodents; those which are not native in its recent fauna are horses, cattle, sheep, camels, true antelopes and swine. The birds, reptiles and insects are not materially different from those of Europe; wild ducks and geese exist in the North; among large birds are the heron, wild turkey, crane, flamingo, gull, falcon, vulture and pelican. The rattlesnake, copperhead, certain kinds of watersnake and the Gila monster are the chief kinds of venomous reptiles. The alligator lives in the slime and water of the lagoons of the Gulf of Mexico. The fish are not distinctive, and resemble those of the colder parts of Europe.

Inhabitants. At the time of the discovery of North America the country was sparsely populated by a barbarous, copper-colored race, to whom the Europeans gave the name of Indians. This people was not unskilled in the arts of carving shells, weaving and the making of pottery. In Mexico and Central America there still exist, though often covered by heavy forests, ruins of temples done in ambitious stone architecture; pueblos, or villages, are also found in the Southwest. The Eskimos, in the remote North, are stunted both in physical growth and material development because of the rigorous climate. The present inhabitants of North America represent a large proportion of the European nationalities. Among these, the English-speaking peoples are in the majority; a great number of French inhabit Canada, and a large proportion of the population of Central America is Spanish. The negroes, originally imported from Africa, dwell principally in the southern part of the United States.

Political Divisions. The independent states of North America and adjoining islands are: the United States, including Alaska, Porto Rico and Hawaii; Mexico, Guatemala, Salvador, Nicaragua, Honduras, Costa Rica, Cuba, Haiti and Santo Domingo. The British possessions are Canada, Newfoundland, the Bermudas, the Bahamas, British Honduras, Barbados, Jamaica and several islands. The French possessions are St. Pierre, Miquelon, Guadeloupe and Martinique; the Dutch, Curaçao; the Danish, Greenland, Santa Cruz, St. Thomas and St. John.

History. The early, and not wholly authenticated, discovery of America was by way of Iceland. There are also stories current that storms and currents of the Pacific Ocean carried Japanese and Chinese vessels to the western coast of America. With the voyage of Christopher Columbus, in 1492, began the consecutive discovery and exploration of the American continent. North America was discovered by John Cabot in 1497; the new territory received its name after Americus Vespucius, who described it upon making a voyage of discovery. The Spanish, Portuguese, French and English early established colonies in the New World. The Spaniards settled in Florida and in what is now southern United States, as well as in Mexico. The French founded colonies in Louisiana and northward to Acadia (now Nova Scotia). The English established themselves principally along the middle Atlantic coast, the first settlement being made at Jamestown, Va., in 1607. By conquest, purchase and treaty the territory north of Mexico has gradually fallen into the possession of the Anglo-Saxon element of the population. During the latter part of the 18th century, the first of the great modern republics—the United States—was established, as a result of the separation of the colonies from the British Government. In 1759, through the defeat of the French at Quebec, the English Crown acquired the greater part of the St. Lawrence region. The Louisiana Purchase, in 1803, added the western basin of the Mississippi to the territory of the United States; in 1867 the further acquisition of Alaska (formerly Russian territory) was effected. Spain lost her control of Mexico and the Central American states in the early part of the 19th century. The United States has slowly gained possession of territory as far west as the Pacific Ocean, and

through the Spanish-American War, Porto Rico has been added as one of the possessions of the United States, while Cuba has gained her freedom from Spanish control. For the history of each division, see separate titles, subhead *History*.

**Northamp'ton, Mass.,** a city and county seat of Hampshire Co., 17 m. n.w. of Springfield, 109 m. w. of Boston and about 140 m. from New York City, on the Connecticut River and on the Boston & Maine and the New York, New Haven & Hartford railroads. It is delightfully situated on a height which commands a fine view of the river valley. Within the corporate limits of Northampton are the villages of Florence, Leeds and Bay State, and it is much frequented as a summer resort. Mt. Holyoke and Mt. Tom, both having electric railways to their summits, are within the vicinity. Northampton has extensive commercial interests. The chief manufacturing establishments include basket and paper-box factories, hosiery mills, machine shops, emery-wheel, cutlery and hardware works and factories for the production of furniture, silver-plated ware and sewing silk.

Northampton has many prominent educational institutions, among the number being Smith College, one of the foremost colleges for women in the United States; the Clarke Institute for Deaf-Mutes; and the Burnham Classical School for girls. The Cooley Dickinson Hospital and Northampton Insane Asylum are located here. There are also the Home Culture Club, which gives instruction in household arts; Memorial Hall; and Academy of Music. The town was settled in 1654 by English colonists and named after Northampton, England. A city charter was granted in 1883. Population in 1910, 19,431.

**Northampton, Pa.,** a city of Northampton Co., 13 m. n.w. of Easton, the county seat, on the Central Road of New Jersey. Iron ore, zinc and slate, which have added materially to the development of the town in the last few years, abound in the vicinity. Northampton has manufactories of flour, shoes, cement, malt liquors, etc. Population in 1910, 8729.

**North Anna River, Battle of,** an engagement of the Civil War, fought in Virginia, May 23 and 25, 1864. When Grant, who was attempting to push on to Richmond, reached the North Anna with 127,000 men, he found Lee's 110,000 Confederates in a strong position on the opposite bank. Warren crossed the river, repulsing Hill's assault and taking 1000 prisoners, while Hancock cleared the Confederates from the Chesterfield bridge. However, when Burnside attempted to cross opposite Lee's center, May 25, he was driven back with fearful slaughter. Being completely blocked, the Federals made a detour to Hanover Courthouse, on the Pamunkey River.

**North At'tleboro, Mass.,** a town of Bristol Co., 30 m. s.w. of Boston and 14 m. n.e. of Providence, R. I., on the New York, New Haven & Hartford Railroad. The villages of Adamsdale, Robinsonville, Oldtown and Falls Village are included within the corporate limits. The chief industries are connected with the manufacture and sale of jewelry, but there are manufactories of cotton yarn, buttons, rope, silverware, braid and jewelers' supplies. The Richards Memorial Library and the Holmes Memorial Building are located here. North Attleboro was settled in 1637 and incorporated in 1887. Population in 1910, 9562.

**North Bay,** a town of Canada, in the Province of Ontario, situated on Lake Nipissing and on the Canadian Pacific and Grand Trunk railways, 146 m. n.w. of Pembroke. The general educational facilities are good and there are several fine churches, representing varying denominations. The hunting and fishing are excellent and the surrounding region is a favorite resort for sportsmen and tourists. The town is the gateway to the Cobalt silver region. Population in 1911, 7737.

**North Brad'dock, Pa.,** a city of Allegheny Co., 10 m. s.e. of Pittsburgh and 2 m. e. of Homestead, on the Pennsylvania Railroad. A large plant of the United States Steel Corporation, en-

gaged chiefly in the manufacture of steel rails, is located here. The borough is a residential place and contains fine public buildings. It was incorporated in 1897 and organized from a part of Braddock Township. Population in 1910, 11,824.

**Northbridge,** *North' brij"*, **Mass.,** a town of Worcester Co., 11 m. s.e. of Worcester, on the Blackstone and Mumford rivers and on the New York, New Haven & Hartford Railroad. There are extensive manufactories of cotton and woolen goods, shirtings and cotton-mill machinery. It was settled as early as 1662, but was set off from Mendon and incorporated as a separate town in 1772. Population in 1910, 8807.

**North Cape,** a promontory forming the most northerly point of Europe. It forms the northernmost part of the Island of Magero, which is separated from the coast of Norway by a narrow channel. It is a bare point of rocks about 1000 ft. in altitude.

**North Car"oli'na,** The Old North State, one of the South Atlantic States, is bounded on the n. by Virginia, on the e. by the Atlantic Ocean, on the s. by the Atlantic Ocean, South Carolina and Georgia and on the w. by Tennessee.

Size. The greatest length from east to west is 503 m. The greatest breadth is 187 m. The average breadth is 100 m. and the area is 52,426 sq. m., of which 3686 sq. m. are water. North Carolina is a little larger than England, almost exactly the size of Alabama and the 27th state in area. Its surface is about one-thousandth part of the land area of the world.

Population. In 1910 the population was 2,206,287. From 1900 to 1910 there was a gain in population of 312,477, or 16.5 per cent. There are 45.3 inhabitants to the square mile, and the state's rank in population is 16.

Surface. North Carolina is naturally divided into three surface areas: the Coastal Plain on the east, the Piedmont Section in the center and the Mountainous Region in the west.

*The Coastal Plain.* This extends inland from 100 to 150 m. and is low and level. The shore line is very irregular, giving the state over 300 m. of coast line. Projections along this coast form capes Hatteras, Lookout and Fear, and the outlying shoals are dangerous to navigation. In the eastern part of the state are the Currituck, Albermarle, Pamlico and other sounds, which are large bodies of salt water lying between the mainland and the "banks." The "banks" are a chain of low sandy islands extending from the northern border to Cape Lookout. In this eastern section there are many swamps and marshes. The most extensive of these is the great Dismal Swamp, the larger part of which is in Virginia. Along the western border the slope becomes more abrupt and some hills occur.

*The Piedmont Section.* This is about 200 m. wide and has an irregular eastern boundary, formerly the shore line of the ocean. Along this line are found the falls in the various rivers that flow into the Atlantic. For this reason the line is often called the Fall Line. The Piedmont Section begins with an elevation of about 200 ft. on its eastern boundary and gradually rises to meet the foothills of the mountains on its western boundary, where the elevation reaches about 1200 feet.

*The Mountainous Region.* The Blue Ridge Mountains, so-called from their color when seen from a distance, form the eastern margin of the third division of the state, the Mountainous Region. This section extends across the state, varying in width from 35 to 65 m., and has an area of about 6000 sq. m. Parallel to the Blue Ridge Range is the Great Smoky Range, whose summit forms the boundary between North Carolina and Tennessee, except at the extreme southwest corner of the state. Of its several chains, the chief are the Iron Mountains in the north and the Unaka Mountains in the south. Between the Blue Ridge and Great Smoky ranges are several cross chains, of which the highest are the Black Mountains, containing Mt. Mitchell, 6711 ft., the highest peak east of the Rockies. Next in importance of

the cross ranges are the Balsam Mountains, extending from South Carolina to the Great Smoky Mountains. The average elevation of the entire section is from 2000 to 5000 ft.

Rivers. The Chowan and the Roanoke flow into Albermarle Sound and drain the northeastern and north-central sections. South of the Roanoke and nearly parallel to it is the Tar, flowing into Pamlico Sound. South of this is the Neuse, draining the east-central part. The Cape Fear River, with its tributaries, drains the central and southeastern portions. The Yadkin and the Catawba, flowing into South Carolina, complete the drainage east of the Blue Ridge. The Hiwassee, the French Broad and Little Tennessee flow westward into the Tennessee River.

North Carolina has a number of lakes in the eastern section, the largest of which is Mattamuskeet, with an area of 100 sq. m. The other large lakes are Phelps, Alligator, Pungo and Waccamaw.

Scenery. The scenery in the western part of the state is particularly interesting and attractive. The intermingling of mountain, hill and valley lends to this region a variety of surface, combining beauty and grandeur. Wherever the rivers have crossed the mountains, especially the Unakas, they have formed deep, narrow gorges of great interest.

Climate. In range of latitude, North Carolina lies between the parallels which cross southern France and northern Algeria. In the east the heat of summer is modified by sea breezes and in the west by altitude. In the east the winters are mild and in the uplands of the interior they are not severe. Among the mountains the thermometer seldom falls to zero, and the mean annual temperature of the entire state is 59°. The climate of the upland and mountainous sections is so salubrious and bracing that these regions are considered as among the best health resorts in the country. Asheville and other towns are frequented by visitors throughout the year, those from the North coming in both summer and winter, and those from the South in summer.

Minerals and Mining. In the northeast section of the mountainous region are valuable mica mines from which a large part of the mica of the country is obtained. North Carolina is also the leading state in the production of monazite. The mining of corundum is also an important industry. Gold is quite generally distributed over the upland regions, and previous to the discovery of gold in California, North Carolina was the leading state in the production of this metal, though it is not now extensively mined. Coal is found in Chatham and Moore and in Stokes and Rockingham counties. An excellent quality of iron ore occurs in the mountain sections. Granite, marble, porphyry, gneiss and other building stone occur in large quantities. In the eastern part of the state there are extensive deposits of clay. Near Wilmington are valuable deposits of phosphate rock, and throughout the mountain section precious stones, including emeralds, rubies, garnets, amethysts, opals and hiddenite, are found.

Forests and Lumber. North Carolina possesses extensive forests of hard woods, pine, cypress and spruce. The yellow, or long-leaf, pine is widely distributed through the forests of the state. Many sawmills have been established and lumbering is the second manufacturing industry. Large quantities of rosin, tar and turpentine are also obtained from the pine forests of the Central Plain.

Agriculture. Agriculture is the chief industry, and, owing to a wide range of soil and climate, a great variety of crops is raised.

*Soil.* In the eastern part of the state the soil is somewhat sandy. Along the rivers it is a clay loam and very fertile. The swamps contain a deep, fertile soil that produces abundant crops where these regions are properly drained. In the central part of the state the soil is a clay loam with some sand and gravel.

*Products.* Nearly all the agricultural products found in the United States

are raised in North Carolina. The most important crops are corn, cotton and tobacco. North Carolina ranks next to Kentucky in the production of tobacco. Cotton is grown in the uplands of the eastern part of the state and in the south-central part. The annual yield is about 1,000,000 bales. Corn is raised throughout the state and some rice is grown on the lowlands along the coast. Large quantities of sweet potatoes are raised, North Carolina ranking first in the production of this crop. Trucking is an important industry in the east, and grapes and other fruit are grown in the upland regions.

Fisheries. Shad and herring fisheries are of great value. In taking these fish, large nets from one to three miles in length are used. They are operated by steam power. Striped bass, menhaden and other fish are taken in large quantities. Excellent oysters are taken from the sounds, and clams, terrapin and turtles abound in the coast waters. The combined fishing industries give employment to about 10,000 men.

Manufactures. The state possesses almost unlimited water power, and excellent factory sites are found along the Fall Line, and in many other places. The manufacture of cotton goods is the chief factory industry and one that is constantly growing. The factories use more cotton than is raised within the state and consume some sent in from other states. This industry gives employment to over 50,000 people. The manufacture of tobacco products ranks second in importance and furnishes employment to over 40,000 people. Following these in the order of importance are the manufacture of lumber and lime products, of rosin and turpentine, of cottonseed oil and cake, of flour and gristmill products and of fertilizers. Tanning and curing leather is also an important industry.

Transportation and Commerce. Some of the rivers flowing into the Atlantic are navigable to the Fall Line about 100 m. from the coast, and Wilmington and Fayetteville have direct communication with the sea. The Atlantic Coast Line, the Seaboard Air Line, the Southern Railway and other railways traverse the state in various directions, the combined mileage of these lines and their feeders exceeding 3600. Excepting some localities in the mountain section, all parts of the state are well provided with transportation facilities. Raleigh, Wilmington, Greensboro and Charlotte are important railway centers.

Government. The present constitution was adopted in 1868 and has been amended several times. The executive department consists of the governor, lieutenant-governor, secretary of state, attorney-general, treasurer, auditor, superintendent of public instruction, commissioner of agriculture and commissioner of labor, all elected by the people for four years. The governor cannot succeed himself. The Legislature consists of a Senate of 50 members and a House of Representatives of 120 members, elected by the people for two years.

The judiciary department comprises a Supreme Court consisting of one chief justice and four associate justices chosen by the people for eight years, and 20 Supreme Court justices elected by the people. The Supreme Court justices hold court in the 20 judicial districts into which the state is divided. Local courts are established in several towns and counties.

Education. The school system is under the supervision of a state superintendent of public instruction. Separate schools are maintained for white and colored children. In the last few years public schools have made rapid advancement. In cities and towns the schools are well graded and high schools are maintained. There is a state normal school and industrial college for white women at Greensboro, and appropriations are made for yearly normal institutes in each county. The University of North Carolina at Chapel Hill is the second oldest in the country. There is an agricultural college for the white people at Raleigh and a similar one for the colored race at Greensboro, and there are

several schools in the state for training colored teachers.

The higher institutions not under control of the state are Davidson College at Davidson; Trinity College at Durham; Guilford College at Guilford; Wake Forest College at Wake Forest; and Southern Presbyterian College at Red Springs. The leading denominational institutions for colored students are Shaw University at Raleigh; Livingstone College at Salisbury; and Biddle University at Charlotte.

State Institutions. Hospitals for the insane whites are maintained at Raleigh and Morganton. There is also one at Goldsboro for colored patients. There is a school for the colored deaf, dumb and blind and also one for the blind white children at Raleigh, and a similar institution for white deaf-mute children at Morganton. The Confederate soldiers' home is at Raleigh, and there is an orphan asylum for whites at Oxford.

Cities. The chief cities are Raleigh, the capital; Charlotte, Wilmington, Winston-Salem, Asheville, Durham and Greensboro.

History. North Carolina, named after Charles I of England, was explored by the Raleigh expedition late in the 16th century, the first colony settling in Roanoke Island in 1585. The first permanent settlement, however, was made about 1653 by Virginians. In 1663 Charles II granted it to eight lords-proprietors, who ruled so liberally that immigrants from Bermuda, Barbados and New England came to Albemarle, as the province was called. In 1670 an unsuccessful attempt was made to establish John Locke's *Fundamental Constitution.* In 1720, having been bought out by the Crown, North Carolina became a royal province. It was one of the first to advise the Declaration of Independence and to adopt an independent constitution; the state was the scene of many important transactions in the Revolution. It ratified the Constitution in November, 1789. North Carolina did not secede till Lincoln called for troops. It then sent double its quota to the South, giving and losing more men than any other Confederate state. The state opposed the plan for reconstruction, but was readmitted to the Union in July, 1868. The state is progressing rapidly along educational and industrial lines. Consult Moore's *History of North Carolina;* and the pamphlets issued by the State Historical Commission.

Governors. Richard Caswell, 1777-1779; Abner Nash, 1779-1781; Thomas Burke, 1781-1782; Alexander Martin, 1782-1784; Richard Caswell, 1784-1787; Samuel Johnston, 1787-1789; Alexander Martin, 1789-1792; Richard Dobbs Spaight, Sr., 1791-1795; Samuel Ashe, 1795-1798; William Richardson Davie, 1798-1799; Benjamin Williams, 1799-1802; James Turner, 1802-1805; Nathaniel Alexander, 1805-1807; Benjamin Williams, 1807-1808; David Stone, 1808-1810; Benjamin Smith, 1810-1811; William Hawkins, 1811-1814; William Miller, 1814-1817; John Branch, 1817-1820; Jesse Franklin, 1820-1821; Gabriel Holmes, 1821-1824; Hutchings G. Burton, 1824-1827; James Iredell, 1827-1828; John Owen, 1828-1830; Montford Stokes, 1830-1832; David Lowry Swain, 1832-1835; Richard Dobbs Spaight, Jr., 1835-1837; Edward Bishop Dudley, 1837-1841; John Motley Morehead, 1841-1845; William Alexander Graham, 1845-1849; Charles Manly, 1849-1851; David Settle Reid, 1851-1854; Warren Winslow, 1854-1855; Thomas Bragg, 1855-1859; John Willis Ellis, 1859-1861; Henry Toole Clark, 1861-1862; Zebulon Baird Vance, 1862-1865; William Woods Holden, 1865; Jonathan Worth, 1865-1867; Gen. Daniel Edgar Sickles, 1867; Gen. Ed. Richard Sprigg Canby, 1867-1868; William Woods Holden, 1868-1870; Tod R. Caldwell, 1870-1874; Curtis Hooks Brogden, 1874-1877; Zebulon Baird Vance, 1877-1879; Thomas Jordan Jarvis, 1879-1885; Alfred Moore Scales, 1885-1889; Daniel Gould Fowle, 1889-1891; Thomas Michael Holt, 1891-1893; Elias Carr, 1893-1897; Daniel Lindsay Russell, 1897-1901; Charles Brantley Aycock, 1901-1905; Robert

Brodnax Glenn, 1905-1909; William Walton Kitchin, 1909-1913; Locke Craig, 1913—. This list includes the governors of Revolutionary times.

**North Carolina, University of** (1789), at Chapel Hill. This institution was opened to students in 1795. It comprises schools of law, medicine, pharmacy, engineering, a college and a graduate department. Women are admitted to the higher courses, and there is a fund for aiding students who need assistance. Free instruction is offered to graduates of colleges and universities, to young men preparing for the ministry or for teaching and to teachers. The library contains over 60,000 volumes and the enrollment is about 800.

**North Dako'ta,** THE FLICKERTAIL STATE, one of the West North Central States, is bounded on the n. by the Dominion of Canada, on the e. by Minnesota, from which it is separated by the Red River of the North, on the s. by South Dakota and on the w. by Montana.

SIZE. The length from north to south is 360 m. and the breadth is 210 m. The area is 70,837 sq. m., of which 654 sq. m. are water. The state is a little smaller than South Dakota or Nebraska, a little larger than Maine and Indiana combined and the 16th state in area.

POPULATION. In 1910 the population was 577,056. From 1900 to 1910 there was a gain in population of 257,910, or 80.8 per cent. There are 8.2 inhabitants to the square mile and the state's rank in population is 37.

SURFACE. The surface of North Dakota consists of three distinct regions. In the east is the Valley of the Red River of the North, a level plain, on the North Dakota side from 20 to 50 m. wide, and varying in altitude from 965 ft. at Wahpeton to 836 ft. at the northern boundary. West of this plain is a region of rolling prairie which is separated from the valley by an abrupt slope that gradually rises westward from a height of about 40 ft. to one ranging from 200 ft. to 300 ft. The Pembina Mountains, a range of low hills near the Canadian boundary, form a part of this slope, and the Turtle Mountains, an uplift from 300 to 400 ft. high, also along the Canadian boundary nearly midway between its eastern and western extremities, belong to this region. The ridge separating the Valley of the Red River from the plain to the west gradually descends as it extends southward, until at Walsh County it blends with the surrounding country. The prairie region gradually rises until on its western border it meets the Coteau du Missouri, a ridge from 300 to 400 ft. high and from 20 to 50 m. wide. To the west of this ridge lies the third surface region, which embraces the highest plain of the state and occupies nearly one-half of its area. East of the Missouri River this region has a billowy appearance and this continues in some places west of the river. Along the streams are deep ravines. The hillsides have been eroded by wind and water and many of them have taken on fantastic forms whose beauty is enhanced by the variety of colors in the rock. Much of this region is good grazing land.

RIVERS AND LAKES. The eastern part of the state is drained by the Red River of the North into Hudson Bay. The Sheyenne, the Park and the Pembina are its most important tributaries. The Souris, or Mouse, River crosses the Canadian boundary three times and drains the north-central part into the Assiniboine and thence into Hudson Bay. The Missouri and its tributaries drain that part of the state west of the Coteau du Missouri. The Missouri is the most important stream in the state. Its chief tributaries from the north are the Muddy, the White Earth, the Shell, Paintedwoods Creek, the Apple and the Big Beaver. From the south and west are the Little Missouri, the Knife, the Big Heart and the Cannon Ball. The tributaries from the south and west are much larger and longer than those from the north and east. The James, flowing into South Dakota, drains the central part of the state.

North Dakota has but few lakes. Devils Lake between Ramsey and Ben-

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son counties is the largest. This is a beautiful sheet of water surrounded by wooded shores, and is a favorite summer resort. Other lakes of importance are Stump Lake in Nelson County and Bush Lake in Cavalier County.

CLIMATE. North Dakota has a cool temperate and equable climate. The winters are long and cold but the atmosphere is clear, dry and bracing, so that the cold here is not felt so much as in many places having a higher winter temperature but greater humidity. The summers are cool and delightful. There are occasional hot days but the nights are cool. The mean annual temperature is 39.4°. The annual rainfall in the Valley of the Red River is about 24 inches, but in the western part of the state it is much less. The eastern part of the state has sufficient rainfall for agricultural purposes by ordinary methods of tillage and in the western part dry-farming is successfully carried on. See DRY-FARMING.

MINERALS AND MINING. That part of the state southwest of the Missouri River contains extensive deposits of lignite coal, the fields practically covering the entire region. Coal fields are also generally distributed over that part of the state west of the 100th meridian, though they are less extensive than those in the first field. The coal outcrops in many places and farmers frequently obtain their fuel by digging it from these veins. In the southwestern part of the state are a number of coal mines in operation and about 300,000 tons of coal are mined each year. Good clay for making brick is found in many localities, and building stone occurs in the Turtle Mountains.

AGRICULTURE. North Dakota is preeminently an agricultural state and has under tillage the largest farms in the United States, some of them containing 30,000 acres under a single management. Modern farm implements and machinery, including steam thrashers and steam plows, are used and scientific methods are employed, all of which bring about very good results.

*Soil.* In the Valley of the Red River of the North the soil is rich alluvium of great depth. In the prairie region clay and sandy loams are found. In general the soils contain an abundance of plant food and produce excellent crops.

*Products.* Wheat is the leading crop and North Dakota is one of the foremost states in raising No. 1 Hard spring wheat, the crop some years amounting to 100,000,000 bushels, with an average of over 90,000,000 bushels. The other products in the order of value are flaxseed, oats, barley, corn, hay and potatoes. Garden vegetables and small fruits flourish and crab apples and the hardier varieties of other apples are also grown.

The western part of the state is well suited to grazing, and large numbers of horses, cattle and sheep are raised in this region. The annual wool clip exceeds 300,000,000 lb. Dairying is common through the state and is a thriving and growing industry.

MANUFACTURES. The production of flour is the leading manufacturing industry and is quite equally distributed over the wheat-growing part of the state. Making brick and pottery is the next industry of importance. Other manufactures local in their nature, that is, designed to supply neighborhood demands, are necessarily of limited extent. Fargo and Grand Forks are the chief manufacturing centers.

TRANSPORTATION AND COMMERCE. The Red River of the North is navigable at high water, but since the construction of railways it is but litttle used. The Great Northern, the Northern Pacific, the Soo and the Chicago, Milwaukee & St. Paul railway systems have numerous lines in the state. Most of the lines, however, are under control of the Great Northern and Northern Pacific railway systems. The trunk lines extend east and west, and numerous cross lines connect these at numerous points. The counties in the eastern part of the state and those in the western part crossed by trunk lines have good railway facilities, but railway construction has not yet reached all the counties in the

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southern and western sections. Fargo and Grand Forks are the chief railway centers.

Wheat, flour, live stock, dairy products and agricultural products are exported, and manufactured goods and some foodstuffs are imported. There are no great commercial centers and the trade is quite equally distributed over the state. This even distribution of commercial and other industries contributes to the general welfare of the people, and North Dakota is said to be the "state without a millionaire and without a pauper."

GOVERNMENT. The constitution was adopted in 1889. It contains a clause prohibiting anyone from interfering with another's obtaining employment or interfering with the enjoying such employment after it is obtained. It also contains a clause prohibiting the liquor traffic. The executive department consists of a governor, lieutenant-governor, secretary of state, auditor, treasurer, attorney-general, commissioner of insurance, commissioner of agriculture and labor, superintendent of public instruction and three railroad commissioners, each elected for two years. The Legislature consists of a Senate of not less than 30 nor more than 50 members, and a House of Representatives of not less than 60 nor more than 140 members. Senators are elected for four years and representatives for two years. Sessions are held biennially and are limited to 60 days.

The judicial department consists of a Supreme Court of five judges elected for six years, and 12 District Courts presided over by a judge for each district, elected for four years. There are local courts in counties and cities.

EDUCATION. North Dakota has a large educational fund derived from public school lands. The state has also made large appropriations of land for state institutions. Public schools are under the general supervision of a superintendent of public instruction and the schools of each county are under the supervision of a county superintendent. There is a board of education consisting of the superintendent of public instruction, the president of the state university, the president of the agricultural college and two additional members appointed by the governor, which has charge of the high schools. State normal schools are maintained at Mayville and Valley City, and another has been recently located at Minot. There is an industrial normal school at Ellendale, a school of forestry at Bottineau and a scientific school at Wahpeton. The state agricultural college is at Fargo and there are substations at Dickinson, Edgeley, Williston, Langdon, and Hettinger. There are also 24 demonstration farms located in different parts of the state. The state university at Grand Forks is at the head of the education system. Fargo College at Fargo is under the auspices of the Congregational Church.

STATE INSTITUTIONS. The asylum for the insane is at Jamestown, the school for the blind is at Bathgate, that for the deaf and dumb is at Devils Lake and the institute for the feeble-minded is at Grafton. There is a soldiers' home at Lisbon. The state penitentiary is at Bismarck and the state reform school at Mandan.

CITIES. The chief cities are Bismarck, the capital; Fargo, Grand Forks, Valley City, Minot, Devils Lake, Jamestown and Mandan.

HISTORY. North Dakota (*Dakota* is the Sioux word meaning allied) was part of the territory bought from Napoleon in 1803 (See LOUISIANA PURCHASE). The first permanent settlement was made by French traders at Pembina in 1870. Because of a mistaken idea as to the location of the Canadian line, Lord Selkirk's colony dwelt here from 1812 to 1823. In 1861 Dakota Territory was organized. By 1875 it had less than 1000 white settlers. Until 1883 Yankton was the capital, when the seat of government was removed to Bismarck. In November, 1889, being separated from South Dakota, North Dakota became a state. Of late years its great agricultural resources have given it exceptional prosperity.

GOVERNORS. John Miller, 1889-1891; Andrew H. Burke, 1891-1893; Eli C. D. Shortridge, 1893-1895; Roger Allin, 1895-1897; Frank A. Briggs, 1897-1898; Joseph M. Devine, 1898-1899; Frederick B. Fancher, 1899-1901; Frank White, 1901-1905; Elmore Y. Sarles, 1905-1907; John Burke, 1907-1913; Louis B. Hanna, 1913—. Few governors have served more than one term.

**North Dakota, University of,** at Grand Forks (1883). By act of Congress 126,080 acres of land, none of which could be sold for less than $10 per acre, were granted for the support of this institution, including its school of music. The university receives from the state a two-fifths of a mill tax. It maintains a teachers' college, a college of arts and departments of law, medicine and engineering. It reports a library of about 37,000 volumes and assets amounting to $2,500,000. The enrollment is about 1000.

**Northern Nigeria,** *Ni je' ri a,* a protectorate of British West Africa, lying between Dahomey and Kamerun and extending from the Gulf of Guinea almost to the 15th parallel north. It covers an area of 256,400 sq. m., inhabited by various African tribes. These natives carry on by barter an extensive trade in forest products, fruits, rubber, kola nuts, ivory, cotton, tobacco, capsicum and peanuts. Iron, tin and potash are mined and cattle and horse raising are practiced in the north. The government is administered by a commissioner, whose residence is at Zungeru. The population is 9,269,000, less than 600 of whom are Europeans.

**Northers,** or **Northwesters,** a local name applied in certain parts of the United States to the steady cold north and northwest winds, or winds accompanied by rain or snow. These winds are anticyclonic in character, that is to say, caused by the downward rush of a volume of cold air from higher to lower altitudes. They take their rise in the plains of western Canada, whence they sweep outward over southern and eastern United States. See COLD WAVE.

**Northrop,** *North' rup,* **Cyrus,** (1834- ), an American educator, born at Ridgefield, Conn. He graduated at Yale in 1857, and two years later from its law school. He was admitted to the Connecticut bar, served as clerk of the Connecticut House of Representatives, and in 1862 as clerk of the Senate. He was professor of rhetoric and English literature at Yale from 1863 to 1884, meantime serving as editor of the New Haven *Palladium,* and from 1869 to 1881 as collector of the port of New Haven. In 1884 he was elected president of the University of Minnesota, where he served with distinction until his resignation in 1911.

**North Sea,** or **German Ocean,** a part of the Atlantic Ocean, lying between Europe and the eastern coast of Great Britain. Through the Strait of Dover and the English Channel it communicates with the Atlantic Ocean, and through the Skagerrak, the Cattegat, the Sound and the Great and Little belts, with the Baltic Sea. It is 680 m. long and has a greatest width of 412 m. Its area is about 200,000 sq. m. Along the rocky Norwegian shore the depth increases to about 1000 ft., the average depth being from 100 to 200 ft. Navigation on its waters is extremely dangerous, due to the violent northwest storms and the constant heavy fogs. The fisheries of cod, herring, haddock, ling and flatfish are very valuable.

**North Ton"awan'da, N. Y.,** a city of Niagara Co., 10 m. n. of Buffalo, on the Niagara River, at the mouth of the Tonawanda Creek, which separates the city from Tonawanda, on the Erie Canal and on the Erie, the West Shore, the Wabash, the Lehigh Valley and the New York Central & Hudson River railroads. It has a good harbor and is an important industrial and commercial center known especially for its lumber and iron interests. The city has a large production of pig iron, structural steel, concrete building blocks, gas motors, steam merry-go-rounds, radiators and miniature railroads. Population in 1910, 11,955.

**Northwestern University,** at Evanston and Chicago, Ill. (1851). This is a coeducational institution under the auspices of the Methodist Episcopal Church. The schools of law, medicine, pharmacy, dentistry and commerce, which take high rank, are in Chicago; while on a beautiful site at Evanston, adjacent to Chicago on the shore of Lake Michigan, there are the college of liberal arts, the school of music and oratory, the school of engineering, Garrett Biblical Institute and the Danish-Norwegian and Swedish Methodist schools, all of which maintain close relations with the university. Preparatory schools are maintained at Evanston, Elgin and Onarga. The library at Evanston contains approximately 150,000 volumes. The university endowment amounts to upwards of $5,000,000, and in all departments there are enrolled about 5000 students.

**Northwest Mounted Police,** a special police of Canada, organized by Sir John A. MacDonald in 1873 and having for their special duty the preservation of law and order on the northwest frontier. The force is under the direction of the Dominion Government and may include 1000 officers and men, but ordinarily the number is from 700 to 900. When the force was organized, the northwestern territory was divided into eight divisions, and these were subdivided into 100 stations. The force is under the general direction of a commissioner and an assistant commissioner, and each division is under the supervision of a superintendent. The term of enlistment is for five years, and the men who serve a full term are entitled to a pension.

From the beginning the organization and discipline were of the highest order, and for nearly 40 years the Mounted Police maintained order, prevented crime and safeguarded the rights of persons and property over the vast territory of the Canadian Northwest. It was through their efforts that the early settlers were kept from the dangers and annoyances so frequently besetting the pioneer. They have attained the reputation of being one of the most efficient police forces in the world.

**Northwest Territory,** in American history that portion of the national domain lying west of Pennsylvania and north of the Ohio River as far as Canada and west to the Mississippi River, which was organized as a United States territory in 1787. The larger part of this territory was claimed by Virginia, Massachusetts, New York and Connecticut by reason of their charter and other grants. Its cession to the general government was brought about by Maryland's refusing to sign the Articles of Confederation unless all the states would cede their rights to the government. Congress, therefore, promised in 1780 that the territory, when ceded to the United States, should be formed into new states on an equal footing with all the others, and the various states ceded their claims. Certain lands, however, were reserved from the cession for special purposes. In 1784 a temporary form of government was drawn up for this territory which provided that out of the territory there should be created 17 states, but this ordinance was succeeded later by the Ordinance of 1787, under which the territory was governed from 1788 to 1802. From it were created the states of Indiana, Ohio, Illinois, Michigan, Wisconsin, and a part of Minnesota. See ORDINANCE OF 1787.

**North West Territories,** that section of Canada reaching from the territory of Yukon on the west to Hudson Bay and its connecting waters. Its northern boundaries are the many arms of the Arctic Ocean, which separate the numerous islands from the mainland, and its southern are the provinces of British Columbia, Alberta, Saskatchewan and Manitoba. In the recent reorganization of Canada, North West Territories was made from the old territory of Mackenzie and the northern portion of Keewatin. Its area is 1,871,100 sq. m.

The northern part of this great territory is beyond the region of forests and is known as the Barren Lands. Upon it grow moss and lichens, the food of the

deer and the caribou. Farther south are the great forests of larch, black spruce and white spruce. Physically the country is chiefly a level plain set with numerous lakes, the largest of which are great Bear Lake and Great Slave Lake, and intersected by several rivers (See MACKENZIE RIVER). The Height of Land, which originates in Alberta near the eastern slopes of the Rocky Mountains and passes through northern Saskatchewan, also crosses North West Territories, making a great curve to the west and then extending northeast to Melville Peninsula. It separates the Mackenzie River basin from the rivers flowing into Hudson Bay.

The most valuable resources are the furs, and the only settlements are the trading posts of the Hudson's Bay Company. The forests will sometime be of greater importance than now, and unexplored regions may later yield minerals. The territory is ruled from the central government at Ottawa, which appoints the local officials. Population in 1911, 17,196.

**North Yak'ima, Wash.,** the county seat and chief city of Yakima Co., situated on the Yakima River and the Northern Pacific Railway, about 200 m. s.w. of Spokane. It is in the heart of a large irrigated district and is the most important commercial center of the Yakima Valley. The manufactories include flour and lumber mills, fruit canneries and woodworking factories. There is an extensive trade in farm products and merchandise, and a number of large warehouses are located here. The city has paved streets, excellent business blocks, schools and churches. The Washington State Fair, which occurs annually, is held here. Population in 1910, 14,082.

**Nor'ton, Charles Eliot** (1827-1908), an American scholar and author, born at Cambridge, Mass. He graduated at Harvard University in 1846, engaged in the India trade in connection with a business house in Boston for a short time, and in 1849 went to India and to Europe, and gradually turned all his attention to literature. From 1864 to 1868 he was editor of the *North American Review,* and in 1875 was made professor of the history of art at Harvard University, becoming professor emeritus in 1898. The finer ideals of culture were his, and his work embodies some of the loftiest aspirations for the good of his countrymen that Americans have ever held. His literary work connects closely with Italy—the country and its history. Among his writings are *The New Life of Dante, The Divine Comedy of Dante* (a prose translation), *Considerations on Some Recent Social Theories, Notes of Travel and Study in Italy, Historical Study of Church-Building in the Middle Ages* and *The Poet Gray as a Naturalist.* He was the literary executor and editor of Lowell, Carlyle, Emerson, G. W. Curtis and Ruskin.

**Norwalk,** *Nor' wok,* **Conn.,** a city and summer resort of Fairfield Co., 30 m. n.e. of New York City and 12 m. s.w. of Bridgeport, on the Norwalk River near Long Island Sound and on the New York, New Haven & Hartford Railroad. Steamers ply between Norwalk and New York. The city is situated in an agricultural region and the shipping of farm products is an important industry. There is also considerable coastwise trade, as well as large oyster interests. There are manufactories of corsets, hats, shirts, cassimeres, worsted goods, silks, shoes, locks, air compressors, general hardware, felt and straw goods and launches. A state armory, the Fairfield County Children's Home and the Norwalk Hospital are located here. South Norwalk is two miles south of Norwalk. It has large industrial works, which comprise manufactories of machinery, boots and shoes, locks and air and gas compressors. Norwalk was settled in 1649, incorporated as a borough in 1836 and received a city charter in 1893. In 1779 it was burned by a British force under generals Tryon and Garth. Population in 1910, 24,211.

**Norwalk, Ohio,** a city and county seat of Huron Co., 16 m. s.e. of Sandusky and 55 m. s.w. of Cleveland, 10 m.

s. of Lake Erie and on the Lake Shore & Michigan Southern and the Wheeling & Lake Erie railroads. It is situated in a productive agricultural region and is noted as a commercial center for a large adjacent section. It is connected with the near-by towns and cities by interurban electric lines. Norwalk's industrial interests are represented by iron and steel works, machine shops, piano and organ works, railroad shops, pyrography works, canneries, pickling works and a large printing and publishing house. There are also manufactories of wood specialties, umbrellas, curtain poles, tobacco, boots and shoes and novelties. The city has a large trade in farm and dairy products, fruit and live stock. There are many handsome residences and well-built business blocks. Norwalk was settled in 1816, incorporated in 1828 and chartered as a city in 1840. Population in 1910, 7858.

**Nor'way,** a kingdom of northern Europe, constituting with Sweden the Scandinavian Peninsula. It extends from 57° 58′ to 71° 11′ north latitude. Its northern coast is washed by the Arctic Ocean; the eastern boundary borders the Russian Government of Archangel for 50 m., Finland for nearly 500 m. and Sweden for 950 m.; on the south is the Skagerrak, connecting the North Sea with the Cattegat and separating Norway from Jutland. The total area is estimated at 124,495 sq. m., or a little more than that of New Mexico. The coast line is generally broken by fiords and islands, and measures approximately 12,000 m. in length.

Surface, Rivers and Lakes. The country as a whole is a rugged plateau, and the ancient mountains along the western coast have been worn down only as a result of long periods of inundation, while the numerous fiords and islands bear witness to the former existence of glaciers. The principal mountain system of the peninsula is known as the Kjölen; in the extreme west of Norway are two other mountain ranges, the Langfjeld and the Dovrefjeld. The loftiest mountain peaks are Jæggevarre (6283 ft.), Kiste Fjeld (5653 ft.) and Snehætta (7615 ft.), the last mentioned adjacent to the Rauma Valley in the south-central part and famous among tourists for its great beauty. Many of the rivers are fairly large, and, after flowing parallel for long distances, unite as they empty into the sea. Among the principal streams are the Glommen (with a basin of 16,000 sq. m.), the Drammen (6600 sq. m.) and the Skien (4250 sq. m.). Very few are navigable, due to the frequent rapids, which add great charm and beauty to the landscape. Lakes dot highlands and woodlands; the largest lie in the deep valleys.

Climate. The warm Atlantic drift, to which the whole western coast is exposed, moderates the climate, and the mean temperature of this region is about 45° F. As a result of the drift, the fiords are practically ice-free, except during extremely severe winters. About 300 m. of the territory lie within the Arctic zone, and a third of the country belongs to the domain of continuous winter darkness and the midnight sun. Even in the southern part of Norway there is no darkness between the end of April and the middle of August; in winter the northern part enjoys only a twilight at midday. Where the land rises to lofty heights, perpetual snows cover the summits, and glaciers descend into the intervening valleys.

Mining and Forestry. The mountains do not yield a rich supply of mineral ores. Silver has constituted the chief product, though iron and copper ores, pyrites and coal are also found. Millstones, soapstone, slate, marble and other building stones more than supply local demand and furnish a large part of the exports. One of the main industries of the country is lumbering; the largest forests are remote from the centers of population, and the conditions have developed a strong and hardy type of timber cutters and log drivers that make their home in the forests during a large part of the year. Pines and spruces represent the chief varieties of trees, and their rapid disappearance around Chris-

tiania points to the devastation constantly attendant upon inefficient methods of conservation. Wood products constitute about one-third of Norwegian exports.

Agriculture and Fisheries. Bare mountainsides comprise 59 per cent of the total country; only 10 per cent is in pasture land and tilled soil, the remaining 22 per cent, forests. Oats, barley, wheat and rye are important products, but no cereal growth is sufficient to supply native demand; potatoes are extensively grown. Much of the prosperous yield of an otherwise slightly fertile soil is due to proper methods of cultivation. The fisheries represent the oldest industry of the country. The value of that part of the catch which is used only for exportation purposes has averaged, during the last 31 years, over $5,000,000 annually. The cod is the largest fishery, and the Lofoten Islands are the center of the catch. Next in importance are the herring and the mackerel. Salmon, lobsters, oysters and sea trout are also obtained. The Arctic Sea is extensively navigated for fishing purposes, and a fairly rich yield in sealskins, oils, whale oil and bearskins is the result.

Manufactures. The lumber industry occupies a large per cent of the population, and numerous saw and planing mills are found along the rivers. At Christiania are large machine shops and carriage and car works, and iron ships are constructed. The large resources of wood pulp make the manufacture of paper significant. Tanneries, tinning works, potteries, china factories, tobacco works, iron foundries, nail-rolling and wire mills are also found. The imports of manufactures are large, due to the fact that the country still remains backward in industrial development.

Transportation and Commerce. The Norwegians are preeminently a race of sailors, and their merchant marine is the largest in the world in proportion to the population, or the fourth largest, in actual comparison. The national commerce is small, but the Norwegian vessels are frequently used as ships of carriage for foreign trade. The railway mileage is largely in the possession of the state, and that portion of it which the government controls now approximates 2000. In commerce, the imports exceed the exports, but the deficiency is made up by the profits accruing from the foreign shipping trade. The imports consist principally of the cereals, rye, barley, wheat; also sugar, coffee, meat, textiles and raw materials (including coal, hides, skins, cotton, wool and hemp). Locomotives, vessels and metal goods are also imported. The exports comprise butter, condensed milk, packing paper, ice, iron and steel nails, metal, ores and salted and dried fish.

Inhabitants. The Norwegians are almost all of Scandinavian origin. There are a few Lapps and Finns, but they constitute only a small per cent of the population. The Norwegians possess strong national characteristics, which persist and make them a highly individual people, as is apparent particularly in their modern music, literature and painting. They preserve many ancient local customs and social practices. Emigration, particularly to the United States, is heavy, but recent years have shown a perceptible decrease, due to the fact that the population is moving instead from the rural districts to the towns. The people as a whole are hardy, and have shown marked preference for the physical sports which require great bodily endurance, and for explorations and navigation on the high seas.

Government and Religion. The government of Norway is a constitutional monarchy, and has been independent of any connection with Sweden since the dissolving of the union between the two countries on June 7, 1905 (See subhead *History*, in this article; also Sweden, subhead *History*). The executive power is vested in a king, and he exercises his authority through a Council of State, consisting of a minister and councilors appointed by him. The Parliament, or Storthing, is the legislative body, and its members take their seats through direct vote of the people. This Storthing divides itself into the two

chambers, the Lagthing, or upper house, and the Odelsthing, or lower house. Bills originate in the Odelsthing; they are then passed to the upper house and become law upon receiving the royal sanction. The State religion is Evangelical Lutheran; all Christian sects, except Jesuits, are tolerated.

EDUCATION. See EDUCATION, NATIONAL SYSTEMS OF.

LITERATURE. See LITERATURE, subhead *Scandinavian Literature.*

CHIEF CITIES. The principal cities are Christiania, the capital; Bergen, Drammen, Trondhjem and Stavanger.

HISTORY. In the early period of its history, Norway consisted of various petty tribal kingdoms. These were united under Harald Haarfagr (about 930). A century later Christianity had become established, and in the 13th century written Norse literature and law began. The death of Haakon V, in 1319, without male heirs, caused the National Assembly to elect Magnus of Sweden king. He was succeeded by his son, Haakon VI. Olaf, son of Haakon VI, and King of Denmark, became ruler of both kingdoms in 1380, and he died without heirs in 1387. Thereupon his mother, Margaret of Denmark, succeeded to both thrones, and in 1389 she also became Queen of Sweden. In 1397, by the Union of Kalmar, she united the three kingdoms under one ruler. During the next few centuries Norway sank to the state of a Danish province, and it was not until 1814 that there came a national awakening. In this year the Danish King Frederick VI was forced to cede Norway to Sweden because he had been the ally of Napoleon. The Norwegians refused to acknowledge this summary disposal of their nation, and at a meeting of delegates a constitution was adopted and the crown of Norway tendered to the Danish Crown Prince Christian Frederick. Upon the invasion of Norway by a Swedish army, a compromise was effected whereby Norway was proclaimed a "free, independent and indivisible kingdom, united with Sweden under one king."

This union did not prove satisfactory to the people of Norway, and when King Oscar in 1905 refused to yield to the Norwegian Storthing in its demand for a separate consular service, it declared the country independent. When the question was laid before the people they decided in favor of the separation by an overwhelming majority. As a mark of friendship the Storthing asked King Oscar to name one of his sons as the King of Norway, and on his refusal, Charles, the son of the King of Denmark, was chosen. He took the name of Haakon VII, and was crowned in 1906. Since then the country has been peaceful and prosperous. Women are granted municipal and Parliamentary suffrage on equal terms with men. In 1911 the University of Christiania celebrated its centenary. Population in 1910, 2,391,782.

**Nor'wich, Conn.,** a city and one of the county seats of New London Co., 13 m. n. of New London and 95 m. w. of Boston, Mass., on the Thames River at the junction of the Shetucket and Yantic rivers and on the Central Vermont and the New York, New Haven & Hartford railroads. It is at the head of navigation on the Thames, 14 m. from Long Island Sound, and has a commodious harbor. Norwich has a large trade in lumber, coal, farm products and clothing for the western part of Connecticut. The city has excellent water power and is one of the prominent manufacturing centers of the state. There are manufactories of a great variety of articles, which include firearms, leather, cotton and woolen goods, silk fabrics, velvets, belting, paper, stoves, furniture and woodworking machinery. There is also considerable shipbuilding. There are many handsome residences which occupy several terraces in the most elevated parts of the city. The streets are broad and shaded with beautiful maples and elms.

Among the educational institutions are the Norwich Free Academy including the Slater Art Museum, and the Otis Free Library. The state insane asylum, state armory and the William W. Backus Hospital are located here. The Indian

burial ground, where Uncas, the founder of the Mohegan tribe, is buried, is of historic interest. Norwich was settled in 1659 by a company from Saybrook and named after Norwich, England. It was chartered as a city as early as 1784 and rechartered in 1871. Population in 1910, 28,219.

**Nor'wood, Mass.,** a town of Norfolk Co., 14 m. sw. of Boston, on the New York, New Haven & Hartford Railroad. Included among its industrial plants are tanneries, iron foundries, railroad repair shops, two large printing plants, book binderies and manufactories of ink and glue. The Morrill Memorial Library is located here. Norwood was incorporated as a town in 1872. Population in 1910, 8014.

**Norwood, Ohio,** a city of Hamilton Co., n.e. of Cincinnati, of which city it is a residential suburb, on the Baltimore & Ohio Southwestern, the Pennsylvania and the Norfolk & Western railroads. It is delightfully situated on a site of great natural beauty and is a popular residence place for many Cincinnati business men. It is also a manufacturing city of considerable importance, many of the establishments being noted for their excellent equipment. The industrial establishments include elastic bookcase works, a playing-card factory, enamel-sign works, lithograph works, a paper-bag factory, a carriage and wagon factory, hardware and iron-casting works, wood-mill workshops and laundry-machine shops. There are many fine public buildings and a number of branch libraries of the Cincinnati Public Library. Norwood was settled in 1790, incorporated as a village in 1888 and received a city charter in 1903. Population in 1910, 16,185.

**Nose,** the respiratory organ through which the air enters the trachea, and also the seat of the sense of smell. In man the nose is triangular and has a bony framework consisting of the nasal bones and the vomer, which forms the partition between the nostrils. The nose contains front and back passages, the former called the nostrils and the latter, the nares. The nostrils are lined with cartilage and a mucous membrane, in which in the upper part of the nostrils the filaments of the olfactory nerve are distributed. In some of the lower animals the nose forms a more prominent part of the face. In the dog it forms the muzzle, and in the elephant and tapir it is prolonged into a proboscis. See SMELL.

**No'tary Pub'lic,** an officer authorized to attest or certify legal documents. In the United States notaries are appointed by the governors of the states for a term of four years upon petition of from 50 to 100 legal voters. Some states, however, compel notaries to give bonds for faithful performance of their duties. A notary may acknowledge legal documents, as deeds or mortgages; may take depositions of evidence; and in some states may exercise the powers of a justice of the peace. A notary receives fees for his services but is disqualified from acting in any matter in which his own interests are involved.

**Notre Dame,** *No' tr' Dam',* **University,** at Notre Dame, Ind. (1842). This is a Roman Catholic institution in charge of the Fathers of the Holy Cross, and on the grounds is the Provincial House of the Order for the United States. This university maintains schools of arts and letters, science, engineering, pharmacy, architecture and law. It has a preparatory department and maintains other such schools in different parts of the country. Its buildings are valued at $2,000,000. The library contains some 60,000 volumes. There are over 1000 students in all departments.

**Nottingham,** *Not' ing am,* a municipal borough and county, the capital of Nottinghamshire, England. It is situated 130 m. n.w. of London, at the confluence of the Leen and the Trent, and is built, in large part, on a sloping rocky eminence crowned by an ancient castle. The fine public buildings include the University College (owned by the municipality), the Exchange, the town and county halls, the Roman Catholic Chapel and St. Mary's Church. Various modern improvements in the way of libraries, parks, gardens, lighting plants, etc., have

been effected through the efforts of the municipality. As an industrial center of prominence, it is known for its manufacture of bobbinet, lace, cotton and silk hosiery, bicycles, baskets and brass products. The castle was built by William the Conqueror and has been the scene of many important historical events. The city is now the seat of a United States consulate. Population, estimated at over 250,000.

**Novaculite,** *No vak' u lite,* a fine-grained quartz, used for whetstones. The best quality of novaculite is quarried in Garland County, Arkansas, and is called Arkansas stone. From it the finest oilstones and razor hones are made. See QUARTZ.

**Nova Scotia,** *No' va Sko' shi a,* a province of the Dominion of Canada. Nova Scotia is a peninsula joined to New Brunswick by the Isthmus of Chignecto, which is 11½ m. wide. The peninsula is surrounded by the Gulf of St. Lawrence on the n., the Atlantic Ocean on the s.e. and the Bay of Fundy on the n.w. Cape Breton Island, which constitutes a part of the province, is separated from the mainland by the Strait of Canso. The length of the peninsula from northeast to southwest is 374 m., its width varies from 30 to 100 m. and the area is 21,428 sq. m., making it next to the smallest province in the Dominion. Population in 1911, 492,339.

SURFACE. A ridge with steep slopes extends along the Bay of Fundy from Brier Island to Cape Blomidon, a distance of about 130 m. There are occasional rocky summits on this ridge, varying in height from 200 to 600 ft. The Cobequid Mountains extend eastward from Cape Chignecto to the Atlantic coast and in their highest altitudes are about 1000 ft. On each side of this range of hills are extensive tracts of comparatively low, fertile land, the Annapolis Valley on the south being known as the Garden of Nova Scotia. The Atlantic coast is high and contains many good harbors. The most widely known indentation is Minas Basin, famous as the scene of the first part of Longfellow's *Evangeline.* On its shores is the little village of Grand Pré, which is visited by many tourists.

RIVERS AND LAKES. The rivers are few and small, but flow into the sea through estuaries that are navigable from 2 to 20 m. The most important streams are the Annapolis, the Avon, the Shubenacadie, the East, the Middle and the West rivers of Pictou County, the Musquodoboit and the Lahave. Lake Rossignol in Queens County is the largest fresh-water lake in the peninsula. Bras d' Or Lake on Cape Breton Island is an arm of the sea.

CLIMATE. The climate is free from extremes of heat and cold and is milder than that of the inland provinces of the same latitude. Being nearly surrounded by water, Nova Scotia is subject to fogs, but they are not considered injurious to health. The summers are cool and enjoyable. The average rainfall is about 45 inches.

MINERALS AND MINING. In Cape Breton and the northern part of Nova Scotia are some of the most valuable bituminous-coal measures in North America. On the island and in Cumberland and Pictou counties coal mining is an important industry. The annual output of all the mines is over 6,000,000 tons, much of which is exported to the United States. Considerable iron is produced in the countries where coal is found, and blast furnaces are located at New Glasgow and Sydney. There are large deposits of gypsum near Windsor in Hants County, and manganese and copper are mined in a few localities.

FISHERIES. Next to those of British Columbia, the fisheries of Nova Scotia are the most important in Canada and they give employment to a large number of people, over 25,000 men being required to man the vessels. Cod, mackerel and lobsters constitute the bulk of the catch. The entire yearly output is valued at about $8,000,000, about one-third that of the Dominion.

FORESTS AND LUMBERING. Forests formerly covered a large part of the province, but most of the forested area

has been cleared and the land converted into farms. Lumbering, however, continues to be an important industry and sawmills are quite generally distributed. The manufacture of wood pulp is also important.

Agriculture. The soil along the streams and in the valleys is generally fertile. Owing, however, to the importance of coal mining, lumbering and the fisheries, agriculture has not been so fully developed as it otherwise would have been. All cereal crops are successful, and in the Annapolis Valley large quantities of apples and peaches are grown, Nova Scotia ranking next to Ontario in the production of apples. Small fruits are also raised for supplying New England markets. Dairying is yearly receiving increased attention and considerable quantities of butter and cheese are exported to England. The region around Minas Basin is noted for its production of hay, and raising live stock is the leading agricultural industry in this part of the province.

Other Industries. The leading manufactures are connected with the production of lumber, wood pulp and iron and steel, as noted above. The streams furnish abundant water power, only a small part of which is utilized. There are a number of sugar refineries; a few cotton mills and coke ovens are found in the coal regions. An extensive commerce is carried on with the Bermudas, the West India Islands and the New England ports of the United States.

Transportation and Communication. The main line of the Intercolonial Railway, which is owned and operated by the Dominion Government, extends from Halifax into New Brunswick. It has a branch extending to North Sydney and connecting New Glasgow with the main line. Branches also extend to Truro and to Pictou and Stellarton. There are also a number of short, local lines connecting Halifax with Yarmouth and a few other commercial centers. Halifax is the chief seaport and has lines of steamers plying to the various ports of Europe and those of the Atlantic coast to the United States, and to the Bermudas and West Indies. Yarmouth is also an important port. There are a number of wireless-telegraph stations in the province, the most important being at Halifax, Sable Island and Glace Bay. There are trans-Atlantic cable stations at Canso and Sydney. Local telegraph and telephone lines are found throughout the province.

Government. The chief executive is the lieutenant-governor, appointed by the governor-general of Canada for five years. He is assisted by an advisory council consisting of heads of the departments of the provincial government. The Legislature consists of two branches, a Legislative Council of 21 members and an Assembly of 38 members. The judges of the courts are appointed by the Dominion Government for life.

Education. There is a good system of free elementary schools and attendance upon them is compulsory. Secondary education is optional, but is well provided for. One high school in each county is raised to the rank of an academy and is open free of tuition fees to those qualified to enter. There are Roman Catholic Colleges at Antigonish and St. Anne. The Dalhousie University at Halifax is undenominational and is the leading educational institution. A provincial normal school and agricultural and horticultural schools are located at Truro, and the College of Technology has been established at Halifax.

Cities. The chief cities are Halifax, the capital; Sydney, in Cape Breton; Pictou, Yarmouth, New Glasgow and Truro.

History. Cape Breton was visited by the Cabots in 1497-98. In 1604 the French made a settlement at what is now Annapolis. From this time until the Treaty of Paris, 1763, the province was the scene of many conflicts in which the French, English and Indians participated. The region was known as Acadia until 1621, when, under a grant to Sir William Alexander, it was named Nova Scotia. In 1654 Cromwell secured possession of the country and it remained

under British control until 1667, when it was ceded to France, but it was returned to the English by the Treaty of Utrecht, 1713. In 1749 Halifax was founded. In 1755 about 6000 French settlers were deported to the English colonies because of alleged disloyalty to the British Government. In 1763 Nova Scotia became a permanent possession of Great Britain, and English and Scotch settlers began to enter the country. It continued as a separate province until 1867, when it became a member of the Dominion of Canada. Since that time its record has been one of continued prosperity.

**No'va Zem'bla,** a group of islands in the Arctic Ocean, forming a part of the Government of Archangel in Russia. There are two large islands of a combined area of 34,500 sq. m., with indented coast line and rocky and mountainous surface. The cold climate dwarfs vegetation; there are large numbers of fur-bearing animals and in the waters are seals and whales. Practically the only inhabitants are visiting hunters and fishermen.

**Novem'ber,** the 11th month of the year, containing 30 days. The name is derived from the Latin word meaning ninth, as this was the ninth month of the old Roman year. When the calendar was changed by the adding of January and February, the name of November remained unchanged, although it became the 11th month. The Anglo-Saxons called it the blood month, probably because of the slaughter of cattle in that month for winter consumption. See CALENDAR; MONTH; YEAR.

**Noyes, Alfred** (1880- ), an English poet, born in Staffordshire, and educated at Exeter College, Oxford. He is a foremost writer of ballads and of patriotic, heroic and occasional verse, and has also produced literary criticism. He has contributed to numerous English and American periodicals, including *Blackwood's Magazine,* the *Fortnightly Review,* the *Atlantic Monthly* and the *Bookman.* A virile and versatile poet, he has a wonderful command of words; his meters are admirable, both in form and clearness; and he writes with decision and confidence. His works include numerous short poems; *The Forest of Wild Thyme* and *The Flower of Old Japan,* fairy tales in verse for children; *Drake,* an epic; *The Enchanted Island and Other Poems; Tales of the Mermaid Tavern; Sherwood,* a play; and *Life of William Morris.*

**Nu'bia,** a region of Egypt lying between the section known as Egypt and the Egyptian Sudan. In east and west extent, it stretches from the Red Sea to the Sahara Desert. Though it is traversed by the Nile throughout its entire length, Nubia is almost wholly desert, for the valley of the Nile is so narrow here as to leave little space for cultivation. In the mountain gorges at the north, upon the islands and between the Nile and its tributary the Atbara, however, agriculture is the chief occupation. Cereals, cotton, tobacco, coffee, senna, dates and indigo are raised. Elsewhere irrigation makes some cattle raising possible. Nubia is traversed by many caravan routes from Suakin, the chief port upon the Red Sea, and the West. The people are mostly Hamitic, known as Berbers, and Arabic. Khartum, Omdurman and Berber are the principal inland cities and are situated upon the Cape-to-Cairo Railway. See EGYPT.

**Nul"lifica'tion,** the act of making any rule, declaration or order null and void. In American history it signifies the refusal of a state to obey an act of Congress. The famous Kentucky Resolutions of 1798 asserted the right of nullification, but the first definite expression of the constitutional right of the states to render null a Federal law occurred in 1828, when Calhoun drafted his *Exposition and Protest* for the South Carolina Legislature, in opposition to the protective tariff of that year. The publication of this *Exposition* in 1830 led to the famous Webster-Hayne Debate on states' rights. In 1832 another protective tariff law was passed, and in November of that year the South Carolina Legislature adopted an ordinance declaring the tariff acts of 1828 and 1832 null and

void. President Jackson, however, took steps to enforce the collection of duties at Charleston, and also issued a proclamation warning the people of South Carolina that the Federal laws must be obeyed. Congress passed the Force Bill in March, 1833, but in the meantime a compromise tariff had been agreed upon and the Nullification Ordinance was repealed.

**Nu'ma Pompil'ius,** second legendary King of Rome, is said to have ruled from 715 to 672 B. C. He was of Sabine origin and is said to have founded the religious ceremonies and institutions of Rome. These were revealed to him by his goddess wife, Egeria, whom he met in a grove by a sacred spring. His writings explaining his system were discovered and burned by order of the Senate 400 years after his time.

**Num'bers,** the fourth book of the Bible and of the Pentateuch, and so named from the two *numberings* of the Children of Israel, at the beginning and end of their wanderings. Covering a period of over 38 years, *Numbers* includes the breaking up of the camp at Sinai, the march upon Canaan and the repulse, the confirmation of Moses and Aaron in authority, several events of the 40 years' wanderings, and the events of the final year. This book also contains numerous fragments of poetry.

**Numismatics,** *Nu"miz mat' iks,* the science of coins and medals. See MINT.

**Num'mulite,** a nearly extinct genus of minute animals belonging to the family of Foraminifera. They resemble coins in shape and range in size from the dimensions of a pinhead to those of a silver dollar. During the Tertiary Period they flourished in vast numbers in nearly every part of the world. Enormous limestone deposits formed of nummulite shells are found in northern Africa, Asia Minor, Persia, India, China, Central America and parts of the Alps. Some of these are several hundred feet in thickness. See FORAMINIFERA.

**Nuncio,** *Nun' shi o,* in the Roman Catholic Church, the title of an ambassador of the highest rank, who represents the pope at a foreign court. The nuncio is not a cardinal. An ambassador of the highest rank, who is also a cardinal, has the title of legate. The nuncio's duties are limited to those of an ambassador.

**Nu'remberg,** a city of Bavaria, Germany, situated on the Pegnitz River, about 95 m. n.w. of Munich. The river divides the inner town into two parts, Sebalderseite and Lorenzerseite, so named after the two largest churches. Surrounding these parts are the suburbs, representing the site of the industrial establishments of the town. The buildings, still retaining many medieval features, are very impressive, and fine samples of domestic architecture from the 15th to the 16th centuries exist. The Church of St. Lawrence and that of St. Sebaldus are handsome Gothic edifices and contain specimens of work by some of the greatest of the old, well-known Nuremberg artists. Secular buildings of prominence are the Kaiserburg, the town hall, the chamber of commerce and the National Germanic Museum. Among spots of interest to tourists are the home of Dürer, the artist, and the quaint little house where Hans Sachs, greatest of the mastersingers, cobbled his shoes and made verses to the sound of his hammer, so poetic that Wagner saw fit to immortalize his name in one of the most impressive operas of modern times.

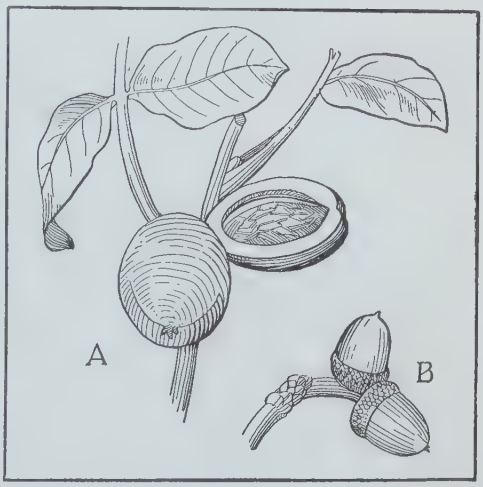
The industrial wares of Nuremberg comprise toys, small articles of gold and silver, hardware, lead pencils, ivory, watches and gold leaf. There are large chemical and machine works and manufactories of railway cars, lithographs, chromos and electrical supplies. Nuremberg has been known to history since 1050. It accepted the Reformation in 1524, and during the Thirty Years' War it was occupied by Gustavus Adolphus, suffering such heavy losses that in 1796 it offered itself (without being accepted) to the King of Prussia, in order to obtain relief from its heavy debt. It was annexed to Bavaria in 1806. Population in 1905, 294,426.

**Nurs'ery,** in agriculture, a place where trees, shrubs and vines are grown

for transplanting or for grafting; herbs and house plants are also grown, but their propagation and care is generally carried on in conservatories or greenhouses. Shrubs and trees for ornamental purposes are largely grown and fruit and shade trees are also raised. Much has been done by nurserymen in improving species, propagating varieties resistant to disease and learning about the habits of plants and the insects and diseases that attack them. There are nearly 5000 nurseries in the United States, occupying over 172,000 acres of land. In them about 3,400,000,000 trees and lesser plants are constantly being raised. Western New York, near Rochester, is at present the center of the nursery business of the United States.

**Nur'sey, Walter R.** (1847- ), a Canadian journalist and public official, born in England and educated at Marlborough College. In 1865 he came to Canada, where in time he entered the service of the Hudson's Bay Company, later becoming a free fur trader. Successively he was the commissary for surveyors, paymaster to the Chippeway Indians in Lac-la-Pluie, stipendiary magistrate in Keewatin, a government transporter of Indian supplies to the Far West, besides chief health officer and fur inspector for Keewatin during 1876 and 1877. Later he was deputy minister of agriculture and provincial auditor for Manitoba and inspector of the Ontario public libraries. Besides contributing frequently to English and American periodicals, he has written prolifically on his wide travels, which were mostly made by canoe, snowshoe, dog train and pack horse.

**Nut,** a name given to a class of fruits which are dry rather than fleshy and have a hard, woody covering which encloses the seed. Nuts generally have but one cell and one seed, though the halves may be more or less separated by a thin, woody partition. When the flowers, which precede the nut, have been surrounded by a cluster of tiny leaflets, called an involucre, which seems to be a part of the flower, the fruit is surrounded by a bur, like the chestnut, a leafy husk like the hazelnut, or merely held in a cup, like the acorn; this covering regardless of its character is called a cupule. Nuts, being the storehouses of food for the new plant, are commonly




NUTS

rich in oils, proteids and starch, and hence are an important food product.

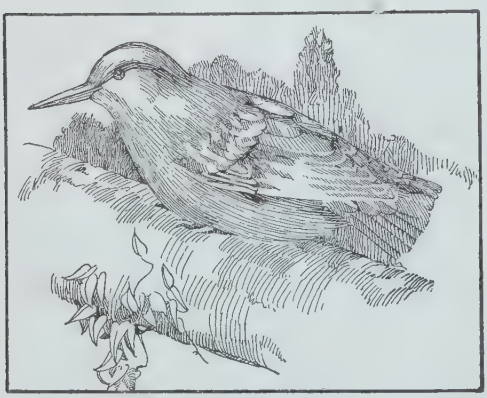
Our best-known nuts are the hickory, beech, walnut, chestnut, hazel, pecan and almond. Other nuts grown only in tropics, as Brazil nuts and coconuts, are imported annually and are of great nutritive value. In the illustration A represents the walnut, and B the acorn.

**Nut'crack"er,** a peculiar Western bird of the Crow Family, about the size of the common pigeon. The plumage is distinct and well marked and the black wings with their white patches are set off by the ashy-gray body. The nest is usually placed in evergreen trees, often 40 ft. above the ground, and is made of twigs bound together by strips of bark and lined with grass and pine needles. Three to five eggs, spotted with brown and gray, are laid. In the winter the food consists principally of pine cones, but at other times is of insects, berries and various seeds. The young are fed on hulled pine seeds. This nutcracker, sometimes called Clarke's crow, is typi-

cally a bird of the mountains, where it makes the most astonishing flights, frequently dropping from the top of a mountain to the valley below, sometimes a distance of nearly 1000 ft., and catching itself by opening its wings like a parachute. It inhabits the pine regions of the West from Mexico to Alaska.

**Nutgalls.** See GALLS.

**Nut'hatch" Family,** a number of species of small birds about the size of a canary, numerous in both hemispheres. They are easily distinguished by their habit of clambering up and down trees and along the branches, going headfirst in either direction with equal facility.



COMMON NUTHATCH

When seen circling a tree in spiral course, they are in search of the insects upon which they feed. The nest is placed in a cavity excavated in a dead tree or stump, and is made of leaves, grass, feathers and hair. Sometimes an old woodpecker's nest is used. From four to six eggs are laid.

WHITE-BREASTED NUTHATCH, or TREE MOUSE. This species is common throughout North America. The birds are about six inches long; the body is bluish-gray above and white below; the top of the head and the neck are black; the wings are black, blue and white; the tail is black, marked with white; and the under feathers are brown. The bill is long and pointed; the tail, short and square. The note is a nasal "yank-yank" repeated "ya-ya."

RED-BREASTED NUTHATCH. The red-breasted nuthatch is smaller than the white-breasted and is usually found in flocks. In winter these birds frequent evergreen forests where they feed upon grubs, secured by prying off scales of bark. The breast is red, but otherwise in color and in habits they resemble the white-breasted nuthatch.

**Nut'meg,** the fruit of a tropical tree of the Myristica Family. The tree is regular in form and grows from 20 to 30 ft. in height. The branches and leaves are of a shiny, gray-green color and have a pleasing appearance. The leaves are long and pointed, having well-marked veins, and the flowers are in drooping clusters of bell-like blossoms, much resembling our lilies-of-the-valley. On different trees, however, the flowers are different in structure: those of one plant are staminate, that is, having the stamens which contain the fertilizing dust; and of another, pistillate, or fruit-producing. The entire fruit is small and resembles a yellow peach in color and general form. As it matures, the flesh becomes leathery, then divides from the top, disclosing a bright scarlet membrane which entirely covers the seed or nut and which is the source of the spice, mace.

Nutmegs must grow about nine years before they are ready to bear, and in order to be sure that the trees will be pistillate, or fruit-bearing, the natives graft branches of pistillate trees upon all the young saplings. For shipping, the nutmegs are merely dried in an oven and packed. Nutmeg is grown in Ceylon, China and both the East and West Indies.

**Nutrition,** *Nu trish' un,* those processes by which plants and animals convert food into living tissue, thus repairing waste and promoting growth. In human physiology nutrition includes digestion of food, absorption of the digested food and its conveyance by the blood to all the tissues and organs, and those chemical changes necessary to transform the digested food into the various tissues. The term *assimilation* is often applied to the last-named process. Elimination, or

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PLANTS FURNISHING VALUABLE PRODUCTS

the gathering and expelling from the body of waste matter, is sometimes considered with nutrition because the processes are so closely related. See ABSORPTION.

**Nux Vom'ica,** a plant, or, more properly, the seeds of a plant of the Gentian Family, from which strychnine is obtained. In warm countries, where it is chiefly found, the plant is a medium-sized tree with smooth, spreading leaves and loose clusters of flowers. The fruit is a large berry, often five or six inches in circumference, and has a dry shell encircling the white, juicy pulp. The seeds, which are poisonous, are very bitter. The wood, called snakewood because it is thought to be an antidote for snake bites, is used also in constructive work; the bark is said to cure leprosy. Nux vomica is native in China but is also grown in Ceylon, Mexico and the Philippines, and is frequently known as Ignatius bean or the bean of St. Ignatius. See STRYCHNINE.

**Nyassa,** *Nyah' sah,* a large lake in the southeastern part of Africa, situated about 380 m. from the Indian Ocean, and southeast of Lake Tanganyika. It is 340 m. long, has an average breadth of 40 m., a maximum depth of 700 ft. and an area of 14,200 sq. m. Mountains surround the lake on all sides, through the gaps of which rivers find their outlets into the lake. The Shiré River drains its waters into the Zambesi. It was discovered by Livingstone in 1859.

**Nye,** *Ni,* **Edgar Wilson** (1850-1896), an American humorist, better known as Bill Nye, born in Shirley, Me. He studied law, removed to Laramie, Wyo., and was admitted to the bar in 1876. There he also served as postmaster, justice of the peace, superintendent of the schools and member of the city council. He was elected to the Legislature and was a newspaper correspondent, contributing humorous articles under the pen name of Bill Nye, chiefly to the Denver *Tribune* and the Cheyenne *Sun.* In 1881 he founded the *Boomerang* at Laramie. Later he removed to New York, and finally to Arden, N. C. His reputation as a humorist was firmly established and because of his ready wit and skill in punning he remained a general favorite. His works include *Bill Nye and the Boomerang, Forty Liars, Baled Hay, Bill Nye's Blossom Rock, Remarks, Chestnuts, Fun, Wit and Humor, The Cadi, Comic History of the United States* and *Comic History of England.*

**Nymphs,** *Nimfs,* in myths, lesser female deities, beautiful and always young. Those dwelling in mountains were called Oreads; in the water, Naiads; in trees, Hamadryads; in forests, Dryads; and in the sea, Nereids or Oceanids. They reared many gods and heroes, attended various divinities and were guardian spirits of places, individuals and races. They were worshiped with Pan in caves or at the springs where they dwelt, and their worship was widespread.

# O

**OAK,** the name of a number of widely distributed trees of the Oak Family. The family contains a few shrubs and low, bushy trees, but the majority of oaks are stately trees, which have an appearance of solidity. There are so many species that in a general way they can be only roughly characterized. The bark is usually dark and furrowed so deeply that heavy, woody ridges mark the trunk; in many oaks, however, the bark is lighter colored and somewhat scaly. The wood, especially that of the white oak, is heavy and valuable. Almost all oaks are easily recognized by their large, gnarled branches, seldom concealed by the leaves. These leaves are variable in shape and are found in a variety of forms even on one tree; the typical oak leaf is the broad-topped, lobed variety, which is always noticeable in the autumn for its brilliant coloring. In texture, the leaves are almost brittle in their papery crispness, and the veins, prominent in the center of the leaf, are tough and fibrous. The flowers bloom after the leaves open in the spring and appear in two forms: long, hanging catkins and short-stemmed, erect pairs of blossoms growing in the axils of the leaves; the latter produce the cup-borne acorns, sometimes edible and sometimes bitter, but always attractive.

The oak grows in all north temperate regions, in the New World as far south as the mountains of Colombia and in the Old World to the Indian Ocean. There are nearly 300 species, 52 of which are common in North America, and five of which are shrubs. The best known are: the white oak, valuable for its lumber, which is used extensively in the manufacture of furniture and for interior decoration, railroad ties and fuel; the bur oak, whose acorn cup is mossy; the yellow oak, whose inner bark yields a yellow dye; the chestnut oak, whose bark is black and deeply ridged; and the live oak, which grows chiefly in the south and is famous for its great low-branched trunk and spreading limbs. Other oaks are red, black, scarlet, Spanish, jack, willow, laurel, single, overcup and cork oaks. The last is a Spanish and Portuguese tree which produces commercial cork.

Everywhere the oak has been famous. The Druids practiced many of their rites beneath the boughs of oak groves and early English ballads have preserved for us the stories of the oak of Robin Hood. Famous, too, are the oak of Dorset, which had an alehouse in its mammoth trunk; the oak of Flushing, which, in contrast, held a Quaker meeting-house; the Charter Oak, in whose hollow base Connecticut's charter lay safely hidden; and the peace oak, sacred to the memory of Eliot and his work with the Indians. See CORK; GALLS; TREE; CHARTER OAK.

**Oakland, Cal.,** the third city in population in the state, and county seat of Alameda Co., on the east, or continental, side of San Francisco Bay, opposite the city of San Francisco, and on the Southern Pacific, the Atchison, Topeka & Santa Fe and the Western Pacific railroads. Passengers and freight from the East are transferred by ferry to San Francisco from Oakland, the railway piers and moles running out into the bay for a distance of 2 m., thus shortening the distance between the two cities. Electric lines also extend to Berkeley, Hayward, Piedmont, Emeryville and various other suburban cities, as well as the interior valleys, the Sacramento and San Joaquin. The Brooklyn Basin, a part of Oakland Harbor, has 300 acres of anchorage, and the shipping trade is steadily expanding. The cities of Oakland, Berkeley, Emeryville and Alameda, practically one community, have a combined water front of about 35 m., and extensive wharves have been constructed by

the Federal and municipal governments. The chief industrial establishments include extensive ironworks, shipbuilding plants, planing mills, cotton mills, canneries, candy factories, flour mills and lumberyards. Electric power is obtained from Colgate, 219 m. distant.

Oakland has an area of 60 sq. m. and is attractively located. It is a city of parks and plazas. Lakeside Park, the largest of the 26 parks, contains a fine grove of oak trees, from which the city takes its name. Lakeside surrounds and stretches out into the waters of Lake Merritt, which is a natural salt-water lake of 170 acres in the heart of the city, filled by the tidal flow of San Francisco Bay. This lake is a favorite pleasure resort and is encircled by broad boulevards and handsome homes surrounded by gardens, lawns and flowers. Foothill Boulevard, reaching from Oakland to Hayward, is one of the most magnificent scenic roadways in the state. This road is 12 m. long, with a 70-foot roadway, and the original cost of building was $300,000. The most noteworthy buildings include the Masonic Cathedral, the Athenian, Elks', Nile and Ebell club buildings, the Y. M. C. A. and Y. W. C. A. buildings, post office, city hall, the Hotel Oakland and Claremont Hotel, Oakland Free Library, about 103 fine churches and 26 missions. Oakland has many hospitals, asylums and homes, including the State Industrial Home of Mechanical Trades for the adult blind. The city has exceptional educational advantages. The University of California adjoins the north boundary line; other educational institutions include the California College (Baptist), coeducational, opened in 1870; a Chinese college in which students from China are educated according to the American system; St. Mary's College (Catholic); St. Joseph's Academy; Snell Seminary; many private, commercial and parochial schools; several high schools; and about 46 public schools. Mills College for women, near the eastern limits of the city, is one of the best-known educational factors of the state.

The site of Oakland lay originally within the limits of a private Mexican grant, which was confirmed by the Federal authorities. A settlement was first begun in 1850, and in 1852 the town was incorporated. It became the county seat in 1874. The commission form of government was adopted in 1910. Population in 1910, 150,174.

**Oats,** an important grain of the Grass Family. A wild species is found among the grasses everywhere and is probably the parent of the cultivated species. There are many species of oats which are adapted to different soils and climates. They furnish straw and the grains which are used as feed for horses and cattle, and for various prepared foods, as oatmeal, rolled oats, etc. As a food oatmeal is widely popular because of its cheapness and high nutritive value, as well as its pleasing taste. Oats yield from 40 to 80 bushels to the acre. The crop in the United States for 1910 was 1,126,000,000 bushels, and of this Iowa and Illinois produced respectively 181,000,000 bushels and 171,000,000 bushels, each being nearly three times that produced by any other state.

**O"badi'ah,** the shortest of the prophetic books of the Old Testament, coming between the books of *Amos* and *Jonah.* The contents of this book, which contains but one chapter, are concerned with the doom of Edom. Obadiah, author of the book and one of the 12 minor Hebrew prophets, lived in the days of Amaziah. See BIBLE, subhead *The Old Testament.*

**Ob'elisk,** a four-sided column, generally made from a single stone and tapering toward the summit, which is cut into pyramidal form. This top is called a pyramidion. The obelisk was the favorite form of memorial architecture in ancient Egypt and was covered with hieroglyphics, recounting triumphs of war or catastrophes of flood or plague. Many of these obelisks have been carried to distant countries; one may be seen in Rome, one in Paris, and the two known as Cleopatra's Needles are separated, one being in New York and one in London.

**Oberammergau,** *O' ber ahm' mer gou".* See PASSION PLAY.

**O'berlin College,** at Oberlin, Ohio (1833). This was the first coeducational college in America. Instruction was begun in 1833, before the charter for the Oberlin Collegiate Institute was secured. Collegiate instruction was begun, and a theological seminary of the Congregational Church opened, about 1835. In 1850 the Institute became Oberlin College. There are now also departments of music, drawing and painting; and a summer school is maintained. The college has a library of about 100,000 volumes, some 20 buildings and total assets amounting to $3,500,000. There are about 2000 students; and a large proportion of them, as in the past, are to a considerable degree self-supporting.

**O'bi** or **Ob,** a river of Siberia, rising in the Altai Mountains and flowing north and northwest through the Siberian governments of Tomsk and Tobolsk for a distance of about 2500 m., after which it empties into the Arctic Ocean through the immense estuary of the Gulf of Obi. The Irtysh, its main tributary, surpasses it in length; the total length, including the different tributaries, is 9000 m. It is not used to a great extent as a waterway, and near its mouth it is ice-locked between October and June.

**Oboe,** *O'boi,* or **Hautboy,** *Ho'boi,* a musical instrument consisting of a box made of ebony or rosewood and divided into three sections, which when joined end to end form a box about 20 inches long, with a bell-shaped mouth. From this mouth a smaller brass tube containing a vibratory reed extends to the other end of the instrument. The modern oboe has keys similar to those on the clarinet, and is considered an important instrument in an orchestra. The oboe is one of the ancient musical instruments.

**Observatory,** *Ob zurv' a to ry,* a place or building set aside for observing natural phenomena, such as the weather, magnetism of the earth and the movements of the heavenly bodies. Astronomical observatories are the most interesting, and are the class usually designated when the term is used without qualification. So far as known, the first astronomical observatory was constructed by the Greeks at Alexandria in 300 B. C. The first observatory in Europe was built at Nuremberg in 1472; that of Tycho Brahe was completed in 1576, and the results of Brahe's observations led to the construction of others. The observatory at Greenwich, England, was opened in 1675, the observatory at Yale in 1830 and that at Harvard in 1839. The United States Naval Observatory at Washington was organized in 1842. In 1912 there were 28 observatories connected with colleges and universities in the United States. The most celebrated of these are the Lick Observatory and the Yerkes Observatory, each of which is described under its title.

For best results, an observatory should be located where the atmosphere is clear, and away from railways and heavy machinery, so that the delicate instruments will not be affected by tremors of the earth. The most desirable location is an elevation, which combines with the advantages named, that of a wide sweep of the horizon.

The building consists of low walls resting on a firm foundation and supporting a dome, which can be turned so that the opening for the telescope may face any part of the sky. The telescope is the chief instrument of every astronomical observation, and it is mounted on a support directly under the center of the dome. The other instruments are the transit and sidereal clock. See TELESCOPE.

**Obsid'ian,** a volcanic rock having the structure and appearance of glass. It is composed of silica, combined with aluminum, calcium, iron, potassium and sodium. It is brittle and hard, has a glassy luster and is variously colored, black, yellow, gray and brown predominating. Like glass it breaks into sharp-edged fragments, and this property has rendered it a valuable material for primitive peoples, who have used it for making arrow points, spearheads, knives and razors. The ancient Greeks and Ro-

mans made mirrors of it, and esteemed it as a gem. It is occasionally used today as an ornamental stone. In chemical composition obsidian is identical with granite and similar to pumice, but differs from both in physical properties. It occurs in regions which have undergone later volcanic action; and in Iceland, the Azores, Milo, California, Mexico, Hungary and New Zealand. The Obsidian Cliff is one of the features of Yellowstone National Park.

**Ocean,** *O' shan,* or **Sea,** the vast continuous body of salt water which covers three-fourths of the earth's surface. It is divided by the continents and by imaginary boundaries into five parts. These five oceans are the Pacific, separating Asia from the two Americas; the Atlantic, lying between America and Europe; the Indian, south of Asia; and the Arctic and Antarctic oceans, which lie about the North Pole and South Pole respectively. The floor of the ocean presents irregularities similar to those of the land, being marked by depressions and elevations corresponding to hills and valleys of the land surface. The greatest depths that have thus far been reached are 31,614 ft., near the Island of Guam in the Pacific, and 27,366 ft., near the Island of Porto Rico in the Atlantic. These are in the great valleys of the ocean bed; the islands occupy the plateaus. The mean oceanic depression sinks much lower below the water level than the mean land elevation rises above it. Throughout the ages the land has been worn down by erosion (See Erosion) and a large part of it deposited in the sea by rivers. Along many coasts the ocean is comparatively shallow for a considerable distance from shore, being often less than 100 fathoms in depth. This belt of shallow water overlies what is called the continental shelf, or that portion of the original continental coast which has been submerged by the sea.

The waters of the ocean are constantly moving in currents (See Currents, Marine). Drifts are movements of the water in an easterly and westerly direction, more changeable in their direction than currents and slower-moving. Tides are waves moving regularly across the ocean under the influence of the sun and moon (See Tides). Tidal waves are infrequent phenomena caused by earthquakes. They traverse the sea from shore to shore, often submerging vast areas of land and causing great damage. The currents of the ocean tend to equalize its temperature. The temperature of the ocean surface, therefore, while it varies with latitude, presents less marked variation than the land, and the change in temperature with the seasons is less marked. The greatest annual variation in one locality is off the coast of Newfoundland, whose shores are washed at certain seasons by cold currents from the north and at others by warm currents from the south. At a depth of about 4000 fathoms, or approximately 24,000 ft., the temperature is practically uniform throughout the ocean's entire expanse, ranging from 32° to 35°. Because of the currents the ocean never freezes solid even in the coldest regions; and owing to the low freezing point of salt water (28°), it is kept from freezing below the surface even in high latitudes. The sea has a marked effect upon the climate of adjacent lands, tempering the cold of winter and moderating the heat of summer by tempering the winds which blow over them.

The chief constituents of sea water are the soluble salts, chlorides and sulphates of the alkalies and alkaline earth. It is its brackish quality which imparts to the water its deep blue and green hues. At the bottom of the sea all is darkness; no light penetrates to the abyss. However, notwithstanding the darkness, the cold and the enormous pressure of the overlying waters, there is an abundance of both vegetable and animal life. The marine life of the Arctic regions is more varied and abundant than the life in the same latitude on land.

The ocean is the great reservoir from which nearly all the circulatory moisture is derived. Its waters are drawn up as vapors by evaporation and carried great

distances by the winds. They then condense and fall as rain or snow, some back into the sea, the remainder upon the land which they nourish, finally returning to the sea as rivers. See RIVER; also articles on the oceans.

**Ocean Grove, N. J.,** a city and noted summer resort of Monmouth Co., about 60 m. s. of New York City and 7 m. s. of Long Branch, on the Atlantic Ocean and on the Pennsylvania and the Central of New Jersey railroads. It is directly south of Asbury Park and separated from it by Wesley Lake. Ocean Grove is on a splendid beach. It is characterized by rigid religious observances, due to its management by a Church organization, as it is controlled by a camp-meeting association of the Methodist Church. There are many fine hotels for summer guests, which frequently number 25,000, an auditorium, temple, etc. Permanent population in 1910, 3100.

**Ocelot,** *O' se lot,* or **Leopard,** *Lep' erd,* **Cat,** a spotted member of the Cat Family, usually living in tropical America but found as far north as Oklahoma. It is about one-half the length of the leopard but is nearly as tall, and is very active and cruel. It makes its home in dense thickets, generally crouching upon the limb of a large tree, along which it creeps cautiously toward its unsuspecting prey. Its color is grayish but spotted with black-rimmed, fawn-colored spots irregular in form, and not only differing in different animals but on the two sides of the same one. The fur is soft and very valuable.

**Ocher,** *O' ker,* a class of mineral pigments consisting chiefly of oxide of iron and varying in color from yellow to red. The color is modified by the presence of manganese, which produces brownish varieties known as sienna and umber, and by burning. Raw sienna, a brownish-yellow, becomes after burning a rich russet-brown, known as burnt sienna; raw umber, a dead brown, takes on a reddish tinge when reduced to a powder by heating. These, together with yellow ocher, which has a soft, mellow tone, are among the standard pigments used by artists. The color is prepared for the market by being freed from all impurities, dried, ground and mixed with oil. Ocher occurs in various parts of the United States, in France, Germany and Italy. The finest quality comes from Oxford, England. See PAINT; PIGMENTS.

**Ocmulgee,** *Ok mul' gee,* **River,** a river of Georgia. It is formed by the union of three small streams, flows southeast and unites with the Oconee to form the Altamaha. Its length is about 280 m., and it is navigable for small vessels to Macon.

**Oconee,** *O ko' nee,* **River,** a river of Georgia. It rises in the northeastern part of the state, flows southward and unites with the Ocmulgee to form the Altamaha. It is about 270 m. long.

**O'Con'nell, Daniel** (1775-1847), an Irish orator and political agitator, born in County Kerry and educated at Cork and in the colleges of Saint-Omer and Douai. France. Admitted to the Irish bar, he early advocated Catholic emancipation, and, though in 1828 he could not take a seat in Parliament, as he could not subscribe to the Test Act, the following year he triumphed with the carrying through of the measure of Catholic Emancipation. Thereafter he continued in Parliament till his death. In 1843 he was convicted, though soon pardoned, for agitating throughout Ireland the repeal of the Union.

**O'Con'nor, Thomas Power** (1848- ), an Irish journalist and Parliamentarian, born at Athlone, Ireland. He was educated at the College of the Immaculate Conception in his native town, and at Queen's College, Galway. He began his journalistic work on th *Dublin Press,* and after that was connected with some London journals. In 1880 he became a member of Parliament and toured the United States the year following, attending the Irish-American Convention and lecturing on Irish questions. He was made president of the Irish National League of Great Britain in 1883; served in Parliament from 1885 to 1906, being reelected in 1906;

and founded and edited the *Star,* the *Sunday Sun,* the *Sun, M. A. P.* and *T. P's Weekly.* Among the books published by him are *Lord Beaconsfield: A Biography; The Parnell Movement; Gladstone's House of Commons;* and *Napoleon.*

**Octave,** *Ok' tave,* **Than'et.** See FRENCH, ALICE.

**Octa'via,** sister of Octavius, later the Emperor Augustus, and wife of Mark Antony. Shortly after the death of her first husband, Claudius Marcellus, she married Antony to secure reconciliation between him and her brother, but in a few years she was forsaken for Cleopatra. In 35 B. C. she made an effort to rescue her husband from his shame, but he not only spurned her but later secured a divorce. To Antony, Octavia was patiently faithful till her death, 11 B. C., devoting herself to the care of his children.

**October,** *Ok to' ber,* the tenth month of the year, containing 31 days. The name comes from the Latin word for eight, as this was the eighth month of the old Roman year. When the calendar was changed by the adding of January and February, the name of October remained unchanged, although it became the tenth month. The Roman festival in which a horse called October was sacrificed to the god Mars, fell in this month. See CALENDAR; MONTH; YEAR.

**Octopus,** *Ok' to pus,* a family of Cephalopods having eight tapering arms. The head is separated from the globular body by a distinct neck, and bears two prominent eyes. The arms of the octopus encircle the mouth and are, in some species, connected by a web. All of the arms bear rows of sucker disks, which lack the horny rim possessed by many Mollusks. The two long tentacles borne by the true cuttlefish are lacking in this family, although in the United States the octopus is frequently spoken of as the cuttlefish. In the waters of the Mediterranean, West Indies and China the octopus grows to a large size, frequently having arms five feet in length; as it lurks in crevices of the rocks, it is a dangerous enemy since its movements are rapid and the strength of its arms powerful. The natural food of the octopus consists of crabs and lobsters, which are found in great numbers near its haunts. See CUTTLEFISH; CEPHALOPODA.

**Odd Fellows, Independent Order of,** a fraternal order representing one of the largest social institutions in the world. It was founded in Manchester, England, in 1813, and introduced into the United States in 1819. In the latter country the membership is about 1,250,000. The headquarters of the American lodges are in Baltimore, Md. The membership in Canada exceeds 200,000. The corresponding order for women is the Rebekah degree.

**Ode.** See POETRY, subhead *Ode.*

**O'der,** a river of Germany. It rises among the Sudetic Mountains in Moravia, flows northwest and falls into the Baltic Sea through the Stettiner Haff. Its length is 562 m. Navigation of its shallow waters is uncertain in dry seasons. The Warthe is an important tributary. The principal towns on the banks of the Oder are Stettin, Frankfort-on-the-Oder, Breslau and Oppeln.

**Odes'sa,** a seaport of Russia, situated on the Black Sea, by rail 1017 m. s.w. from Moscow. Steep crags form a descent to the sea, and underneath the town are the catacombs formed by the removal of sandstone for building purposes. The city is distinctly West-European, modern and wealthy. Among important buildings are the Cathedral, the royal palace, several mansions, the university, the town theater and the municipal library. Odessa is becoming a popular summer bathing resort. It is the chief seaport of Russia, and in population and trade ranks next to St. Petersburg, Moscow and Warsaw. The large corn trade brings in a great number of laborers, estimated at 35,000, who are forced to lie idle when the busy season is over and resort to the catacombs in their dire poverty. Grain, especially wheat, is the chief export. Other exports include wool, hemp, flax, timber,

iron and coal. The principal industries are oil mills, paper factories, chemical works, sugar refineries and tin-plate works. Odessa was founded in 1794, and has been the scene of violent revolutionary disorders. Population in 1909, 478,900.

**O'din,** or **Wo'den,** in myths, highest Norse god, all-powerful ruler of the universe and progenitor of all other divinities. His throne in Asgard, the residence

ODIN

of the gods, overlooked the world, of which his two ravens daily furnished him minute tidings. In Walhalla, where he presided as war god, he sumptuously entertained by feasting and fighting the fallen heroes conducted thither by his messengers, the Valkyries. Odin was represented as a vigorous man of about 50, clad in a long robe of blue and gray, representing the sky with its clouds. He carried the spear by which inviolable oaths were sworn, and wore the ring of fruitfulness. About him were his ravens and wolves. The word *Wednesday* came from Woden.

**Odoacer,** *O″ do a′ ser,* (about 434-493), the first barbarian ruler of Italy, supposed to have come from the middle Danube region. He led a revolt in 476, deposed the Emperor Romulus Augustulus, and assumed the royal power. The Ostrogoths under Theodoric invaded Italy in 489, and Odoacer was defeated in three battles. Later he was treacherously slain.

**Odyssey,** *Od′ i sy.* See ILIAD.

**Œdipus,** *Ed′ i pus,* the hero of a Theban legend and the son of Laius, King of Thebes. Laius had been warned by the oracle at Delphi that he was to die at the hands of his son. When Œdipus was born he was given to a herdsman to be exposed on Mt. Cithæron. The herdsman, however, gave the child to Polybus, King of Corinth, by whom he was brought up. When a young man, Œdipus learned that he was not the son of Polybus, and sought the oracle at Delphi to learn his parentage, but he did not obtain the desired information. However, he was told that he was doomed to slay his father. He fled from Corinth and on his way to Thebes met Laius, whom he killed in an encounter, being ignorant, of course, of his identity. He found Thebes in a turbulent condition because of the Sphinx, who propounded a riddle to all who entered the city's gates and devoured those who failed to solve the riddle. Creon, a brother of Jocasta, who was the mother of Œdipus, was king, and he had offered the hand of Jocasta and the kingdom to anyone who would solve the riddle and kill the Sphinx. Œdipus solved the riddle, killed the Sphinx and married Jocasta, not knowing that she was his mother. For several years he was happy and prosperous. Four children, two sons and two daughters, were born to him and Jocasta. Finally he was made aware of his condition and was so overpowered with remorse that he put out his eyes. Jocasta hanged herself and Œdipus was expelled from Thebes. His faithful daughter, Antigone, was his constant companion in his years of wandering, until he bade her farewell and entered a dense forest from which he never returned. See ANTIGONE.

**Offenbach,** *Of′ en bahk,* **Jacques** (1819-1880), a composer of French comic opera, born at Cologne, of German-Jewish parents. Beginning as a cellist in orchestra, he soon became con-

ductor in the French Theater at Paris. He produced some 69 operatic works. His operas are marked by a strain of coarseness, but are gay and vivacious. Notable among them is *The Grand Duchess of Gérolstein. The Tales of Hoffmann,* produced in 1881, also won popular favor.

**Ogden, Utah,** a city and county seat of Weber Co., 35 m. n. of Salt Lake City, on the Ogden River, at the western base of the Wasatch Mountains, and on the Southern Pacific, the Union Pacific, the Denver & Rio Grande and the Oregon Short Line railroads. Ogden is well built and has a modern electric street-car and interurban system. The city has an elevation of 4300 ft. above sea level and has extensive mining, agricultural, horticultural and live-stock interests. In importance as a commercial and railway center, Ogden is second in the state to Salt Lake City. The entrance to the noted Ogden Canyon is near the eastern limits of the city. Here are located natural hot springs, famed for medicinal properties, and a large sanatorium. The Oaks, Hermitage and the Idlewild are among the popular places of the canyon for entertainment of tourists.

Among the noteworthy buildings of Ogden are the courthouse, city hall, Federal Building, a Carnegie library, Tabernacle, city hospital, Masonic Temple and a large number of churches. The public parks and excellent waterworks are owned by the city. The educational institutions include a state industrial school, state school for the deaf and blind, two business colleges, the Weber and Sacred Heart academies, public schools, a Mormon school and a high school which cost $100,000. In the stock industry Ogden is important as a shipping and packing center, the packing houses being among the most modern in the West. Over $1,000,000 is also invested in the canning industry, and fruits and vegetables are canned in large quantities. There are large deposits of salt, clay, cement, coal and iron near the city. Ogden is said to have been named in honor of John Ogden, a hunter and trapper. In 1850 the place was laid out under the direction of Brigham Young. Since 1898 the city has been governed under a general law of the state. Population in 1910, 25,580.

**Ogdensburg,** *Og' denz burg,* **N. Y.,** a city and port of entry of St. Lawrence Co., 137 m. n.e. of Syracuse and 142 m. n. of Rome, on the St. Lawrence River at the mouth of the Oswegatchie, and on the New York Central & Hudson River and the Rutland railroads. Ogdensburg, as the terminal of deep-water navigation on the Great Lakes, has steamer connection with the principal lake ports. The St. Lawrence River at this point is over a mile wide and is crossed from Ogdensburg by steam ferryboats plying between this city and Prescott, Ontario. Among the prominent educational and charitable institutions are the St. Lawrence State Hospital, Northern New York General Hospital and United Helpers' Home. It has also a fine customshouse, state armory and several parks. Its manufactured products include lumber, flour, brass goods, boilers, leather, silks, etc. It was chartered as a city in 1868. Population in 1910, 15,933.

**Oglesby,** *O' g'lz by,* **Richard James** (1824-1899), a United States senator, born in Oldham County, Ky. He removed to Illinois at the age of 12. In 1845 he was admitted to the bar. From 1849 to 1851 he was engaged in mining in California, after which he returned to Decatur, Ill., where he had previously lived. He was elected to the State Senate in 1860, but soon resigned to enter the Union army, serving at Ft. Henry, Ft. Donelson, Shiloh and Corinth. He retired from the army in 1864 with the rank of major-general of volunteers. The same year he was elected governor of Illinois, which position he occupied until 1869, and was again elected in 1872. He was United States senator from 1873 to 1879, and served again as governor of the state from 1884 to 1889, after which he retired to private life.

**Oglethorpe,** *O' g'l thorp,* **James Edward** (1696-1785), an English soldier and reformer who founded the State of

Georgia, was born in London, of ancient family. On leaving Oxford, he entered the army, participating in the defeat of the Turks at Belgrade. In 1722 he inherited the family estate and entered Parliament, where he was chairman of a commission which investigated imprisonment of debtors. As a result of disclosures, Oglethorpe secured a grant of land between the Savannah and the Altamaha rivers in Georgia, where he planned to establish a colony for debtors and for worthy poor. On Nov. 17, 1732, he and a band of 130 landed at Charleston. They settled Savannah in 1733 (See GEORGIA, subhead *History*). As governor of the colony, Oglethorpe demanded obedience, although he ruled with great tact and liberality. He led several expeditions against the Indians and Spanish, in May, 1740, moving upon St. Augustine, and in June, 1742, freeing Georgia from all danger of Spanish conquest. In 1743 he went to England, never to return. He there became a brigadier-general. In 1752 he and the other trustees resigned their Georgia charter, and the colony became a royal province.

**O'Ha'gan, Thomas** (1855- ), a prominent poet, essayist and journalist, born near Toronto, Canada, and educated at Ottawa, Syracuse and other universities. He entered the teaching profession in 1874, being head of various Roman Catholic separate schools and language master in several Ontario high schools. Besides lecturing widely, Dr. O'Hagan has contributed prose and verse to such publications as the Toronto *Globe,* the *Canadian Magazine, The Rosary,* the *Boston Pilot,* the Milwaukee *Citizen* and the Chicago *New World.* He became chief editor and director of the *New World* in 1910. His works include *A Gate of Flowers, Songs of the Settlement, Studies in Poetry* and *Essays, Literary, Critical and Historical.*

**O. Henry.** See PORTER, SYDNEY.

**Ohi'o,** THE BUCKEYE STATE, one of the East North Central States, is bounded on the n. by Michigan and Lake Erie, on the e. by Pennsylvania, on the s.e. by West Virginia, on the s. by Kentucky and on the w. by Indiana. The Ohio forms the southeastern and southern boundaries.

SIZE. The greatest length from north to south is 210 m. and from east to west, 225 m. The area is 41,040 sq. m., of which 300 sq. m. are water. Ohio is a little larger than Kentucky and a little smaller than Tennessee or Virginia, about one-half the size of Minnesota and the 35th state in area.

POPULATION. In 1910 the population was 4,767,121. From 1900 to 1910 there was a gain in population of 609,576, or 14.7 per cent. There are 117 inhabitants to the square mile and the state ranks fourth in population.

SURFACE. A low ridge forming a watershed, or divide, extends in an irregular line from the northeastern corner of the state to the middle of the western boundary. North of this line the surface is low and generally level, and slopes gently toward Lake Erie. Much of the larger part of the state is south of this divide. The surface in this portion is more rolling and broken, the higher lands being cut through by the Muskingum, Scioto and other rivers, forming large, deep valleys. This region contains some elevations from 1000 to 1500 ft. above sea level, and the highest point, near Bellefontaine, a little west of the center, has an altitude of 1541 ft. The lowest land is in the Valley of the Ohio near Cincinnati. The average elevation of the state above the sea is 850 ft.

RIVERS AND LAKES. The divide separates the state into two drainage basins, one including the rivers flowing into Lake Erie and the other those flowing into the Ohio. The Ohio, forming the southern boundary, has a frontage on the state of 436 m. It receives the Muskingum, the Hocking, the Scioto, the Little Miami and the Great Miami. The Muskingum is the largest river wholly within the state. The main streams flowing into Lake Erie are the Grand, the Cuyahoga, the Sandusky and the Maumee. These rivers have broad estuaries at their mouths.

Lake Erie has a frontage of about 236 m. along the level and on its shores are a number of good harbors. In Summit County are several small lakes noted for the beauty of their scenery.

Climate. Ohio has a mild temperate climate, though it is subject to extremes in temperature. These are, however, of short duration. There is a marked difference in temperature between the northern and southern parts of the state. In the north the winters are longer and colder and the summers are cooler, owing to the influence of Lake Erie. The lake shores are very pleasant and contain a number of popular summer resorts. The mean temperature of the state for July is 73° and for January, 26°. The average annual rainfall is 39½ inches.

Minerals and Mining. The bituminous coal fields of Ohio have an area of over 1000 sq. m., most of them being in the eastern part of the state. Coal mining is one of the most important mineral industries. There are coal mines in 29 counties. The production of petroleum is also very important. Ohio has two oil fields, one in the eastern part and another in the northwestern; the latter, known as the Lima Field, is one of the most important fields in the United States. Natural gas is found in large quantities in the east-central and northwestern parts of the state. Cuyahoga and Lorain counties contain quarries of the best sandstone in the United States. From a sandstone known as Berea grit most of the grindstones and stones used in the manufacture of wood pulp in the country are obtained. Limestone is quarried for flux, a building and smelting ore, and for the manufacture of quicklime and cement. Ottawa County contains a large bed of gypsum. Iron ore is found in several localities, but is not extensively worked because of the mines in the Lake Superior district. Clay suitable for brick, tile and pottery is widely distributed.

Forests and Lumber. Much of the land formerly covered with forests has been cleared and converted into farms. However, large forests containing sufficient quantities of maple, oak, chestnut, cedar and pine to make the manufacture of lumber and lumber products a thriving industry, still remain.



Agriculture. Ohio is one of the leading agricultural states. Over 94 per cent of the land is in farms, and over 78 per cent of the farm land is under tillage. The suitable climate, fertile soil, abundant rainfall and the location within the state of excellent markets are all favorable to agricultural interests. The farms are small, averaging less than 90 acres, and about three-fourths of them are tilled by their owners.

*Soil.* Over a large part of the state the soil was formed by deposits of drift, and nearly all of it is fertile. Along the rivers the soil is alluvial and in the northwestern portion it is clayey.

*Products.* There is a great variety of products, but corn, wheat, oats, hay, potatoes, apples and tobacco are the principal crops. Most of the corn and wheat is raised in the western part of the state, and the northwestern counties are best for oats. The southwestern counties raise most of the tobacco. Apples, peaches, pears, grapes and small fruits are raised in abundance, and growing vegetables for the markets of Cleveland, Cincinnati, Toledo and other large cities is an important industry.

Excellent pasturage is found in all parts of the state, and raising live stock is a valuable source of income. Horses, cattle, sheep and hogs are raised in large numbers, and Ohio is an important state in the production of wool. Dairying is a leading branch of animal husbandry and the annual income from dairy products is about $15,500,000. Poultry is also an important source of revenue in nearly all parts of the state.

Manufactures. Ohio is one of the leading manufacturing states. It is first in the manufacture of wagons and carriages and of pottery and clay products, and second in the manufacture of agricultural implements and prepared foods. Next in order are the manufacture of flour and gristmill products, roasting and

grinding coffee and the preparation of spices, making machinery and castings and the manufacture of distilled liquors, soap, candles, tobacco, cigars, cigarettes, boots and shoes, rubber goods, automobiles, cash registers, clothing, paper, brick and tile and paints. The chief manufacturing centers are Cleveland, Cincinnati, Youngstown, Toledo, Columbus, Springfield, Dayton and Akron.

Transportation and Commerce. The state is well provided with water communication. The Ohio connects it with western Pennsylvania and the Mississippi. The Muskingum is navigable for about 400 m. There are numerous good harbors on Lake Erie, and through this lake and the Erie Canal water connection with the Atlantic is secured. These harbors have determined the location of Cleveland, Sandusky, Toledo and other lake ports. Coal, iron, lumber and other heavy freight are as far as possible carried over the water routes.

Ohio has about 1000 m. of railways, which extend throughout the state in all directions. The most important systems are the New York Central, which includes the Lake Shore & Michigan Southern, the Pennsylvania, the Baltimore & Ohio, the Big Four (Cleveland, Cincinnati, Chicago and St. Louis), the Erie, the Hocking Valley and the Toledo & Ohio Central. There is also a network of interurban electric lines which greatly facilitate travel. Throughout the state there are excellent transportation facilities.

The state has an extensive commerce, a good part of which consists in the interchange of products between the manufacturing centers and the farming communities. Cleveland, Cincinnati, Toledo and Ashtabula are important ports for the transshipment of goods brought from other states. In the lake ports the transshipment of iron ore and coal is especially heavy. Farm produce, coal and the various manufactured products are sent to other states and some manufactures reach foreign lands. Raw material for manufacture, some foodstuffs and some manufactured goods are imported. Cleveland, Cincinnati and Toledo are the chief railway and commercial centers.

Government. The present constitution was adopted in 1851, but has been amended several times, the last time in 1912. The Ohio Constitutional Convention of 1912, during a session of five months, ending in May, adopted 42 amendments which were submitted to the people for a referendum vote in September. Thirty-four of these amendments were adopted at that election. Ohio's constitution as amended is distinctly progressive in character. Greater powers were conferred on the Legislature in respect to the control of corporations, labor laws, the levying of progressive-inheritance and income taxes, and the protection of the natural resources of the state. The people of cities, however, were empowered to frame their own charters. Provision was made for the initiative and the referendum, and for the minimum wage and workmen's compensation.

The executive department consists of a governor, lieutenant-governor, secretary of state, auditor, treasurer and attorney-general, each of whom, with the exception of the auditor, is elected for two years. The auditor is elected for four years; the commissioner of education and members of the board of public works, for two years. The Legislature consists of a Senate and House of Representatives, the members of both houses being elected for two years. The Legislature meets biennially and the sessions are unlimited.

The judicial department consists of a Supreme Court, Courts of Appeals, Courts of Common Pleas, Probate Courts and such inferior courts as may be established by law. The judges of the Supreme Court are elected by popular vote for not less than six years. The state is divided into appellate districts, in each of which there is a Court of Appeals, consisting of three judges, whose terms of office are six years.

Education. The schools are among the best in the country, and are under

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1. Buckeye
2. Fruit
3. Lake Commerce
4. Ore & Coal Docks
5. State Flower
6. Blast Furnace
7. Farming
8. Coal Mining
9. Sheep and Hogs
10. Stockyards
11. Implement Mfg.
12. Potteries
13. Tobacco Warehouse
14. Oil Wells

the charge of a commissioner of common schools who exercises the powers and discharges the duties of a state superintendent of public instruction. Ohio was the first state to derive benefit from the public school lands set apart in the Northwest Territory by the Ordinance of 1787 (See ORDINANCE OF 1787). The schools are well organized, thoroughly equipped and taught by trained teachers. It was in Ohio that the movement for consolidating the rural schools was inaugurated and carried forward with remarkable success. The higher institutions under control of the state are the Ohio State University at Columbus; Miami University at Oxford; Ohio University at Athens; and Wilberforce University at Wilberforce.

The most important institutions of learning not under control of the state are Oberlin College at Oberlin; Marietta College at Marietta; Ohio Wesleyan University at Delaware; St. Xavier College at Cincinnati; Western Reserve University at Cleveland; Denison University at Granville; Hiram College at Hiram; University of Wooster at Wooster; Wittenberg College at Springfield; Otterbein University at Westerville; Kenyon College at Gambier; Heidelberg University at Tiffin; and Buchtel College at Akron. Of more recent date are the University of Cincinnati and the Case School of Applied Science; the latter is located at Cleveland.

STATE INSTITUTIONS. The hospitals for the insane are at Athens, Cleveland, Columbus, Dayton, Longview and Toledo. The schools for the blind, the deaf and the dumb, and the feeble-minded are at Columbus. The soldiers' home is at Dayton and the soldiers' and sailors' home at Sandusky. The state penitentiary is at Columbus and the state reformatory at Mansfield. There are also state industrial schools for boys and girls at Columbus.

CITIES. The chief cities are Columbus, the capital; Cleveland, Cincinnati, Toledo, Dayton, Youngstown, Akron, Springfield, Canton, Zanesville and Sandusky.



HISTORY. Ohio, the name of which is the Senecas' expression "How beautiful!" and which was applied to the Allegheny-Ohio River, was first seen by Joliet in 1669. French fur-trading stations were soon built about Maumee City, at Sandusky and at Cuyahoga; but all French claims were surrendered to the English in 1763. In 1787, by Manasseh Cutler, Rufus Putnam and other New England veterans of the Revolution, the Ohio Company was formed. For $1,000,000 it bought from the government a tract of 1,500,000 acres lying northwest of the Ohio River. This, the first public sale of land by the government, led to framing the Ordinance of 1787.

In 1788 settlements were made at Marietta and Cincinnati. In 1796 Cleveland was founded. Wayne's victory at the Battle of the Maumee, 1794, caused the Treaty of Greenville, whereby the defeated Indians granted to the United States nearly all Ohio with sections of Indiana and Michigan. Danger from the Indians being removed, settlements sprang up rapidly. Dayton was founded in 1796, as was Chillicothe, where in 1799, the first Legislature met and sent William Henry Harrison to Congress. Ohio adopted a constitution in 1802 and on Feb. 19, the following year, it became a state. In 1811 the first steamboat, the *Orleans*, came down the Ohio from Pittsburgh. The state was prominent in the War of 1812, and, for the Civil War, furnished about 320,000 men besides many famous generals, including Sherman and Sheridan. As Ohio was in the direct path of Western immigration, it developed rapidly. Consult Rufus King's *Ohio* in the American Commonwealths Series.

GOVERNORS. Edward Tiffin, 1803-1807; Thomas Kirker, 1807-1809; Samuel Huntington, 1809-1811; Return Jonathan Meigs, 1811-1814; Othniel Looker, 1814-1815; Thomas Worthington, 1815-1819; Ethan Allen Brown, 1819-1822; Allen Trimble, 1822-1823; Jeremiah Morrow, 1823-1827; Allen Trimble, 1827-1831; Duncan McArthur, 1831-

1833; Robert Lucas, 1833-1837; Joseph Vance, 1837-1839; Wilson Shannon, 1839-1841; Thomas Corwin, 1841-1843; Wilson Shannon, 1843-1844; Thomas W. Bartley, 1844-1845; Mordecai Bartley, 1845-1847; William Bebb, 1847-1849; Seabury Ford, 1849-1851; Reuben Wood, 1851-1853; William Medill, 1853-1856; Salmon P. Chase, 1856-1860; William Dennison, Jr., 1860-1862; David Tod, 1862-1864; John Brough, 1864-1865; Charles Anderson, 1865-1866; Jacob D. Cox, 1866-1868; Rutherford B. Hayes, 1868-1872; Edward F. Noyes, 1872-1874; William Allen, 1874-1876; Rutherford B. Hayes, 1876-1877; Thomas L. Young, 1877-1878; Richard M. Bishop, 1878-1880; Charles Foster, 1880-1884; George Hoadley, 1884-1886; Joseph B. Foraker, 1886-1890; James E. Campbell, 1890-1892; William McKinley, Jr., 1892-1896; Asa S. Bushnell, 1896-1900; George K. Nash, 1900-1904; Myron T. Herrick, 1904-1906; John M. Pattison, 1906; Andrew Lintner Harris, 1906-1909; Judson Harmon, 1909-1913; James M. Cox, 1913-1915; Frank B. Willis, 1915—. Governors are elected in November of even-numbered years.

**Ohio and Erie Canal.** See CANAL.

**Ohio Company,** an organization authorized by Congress in 1787 at the solicitation of Rufus Putnam and others, and having for its purpose the forming of settlements in what is now the State of Ohio. A large tract of land was purchased from the government on very liberal terms, and settlers were induced to enter the new country. The company was largely instrumental in securing the passage of the Ordinance of 1787 for governing the Northwest Territory. See ORDINANCE OF 1787; OHIO, subhead *History*.

**Ohio River,** a large river of the United States, formed by the Allegheny and the Monongahela, which unite at Pittsburgh, Pa. The Ohio flows westward and southwestward. It forms the boundary between Ohio and West Virginia, and between Ohio, Indiana and Illinois, and Kentucky, and enters the Mississippi at Cairo, Ill. It is about 1000 m. long, and it drains an area of about 200,000 sq. m. During the open season it is navigable for large steamers to Pittsburgh, except in times of low water. Rapids near Louisville obstruct navigation and boats pass around them in a canal. The chief tributaries from the north are the Muskingum, Scioto, Miami and Wabash, and from the south the Great Kanawha, Big Sandy, Licking, Kentucky, Green, Cumberland and Tennessee. The Ohio is subject to great variations in level, the difference between high and low water sometimes being 50 ft. or more.

**Ohio, State Universities of.** Ohio has three state universities, located and chartered as indicated below. Up to 1911 state normal schools were maintained only at Athens and at Miami.

OHIO UNIVERSITY, at Athens, was chartered in 1804 and opened in 1809. For its support two townships of land were set aside in 1787. Its annual receipts, including state appropriations, are about $250,000. It maintains a collegiate department, a normal school and schools of music and commerce. The library contains some 30,000 volumes and there are about 1200 students.

MIAMI UNIVERSITY, at Oxford, was chartered in 1809 and college work was begun in 1824. A township of land, ceded by Congress to the state, was the nucleus of its endowment. Its first class of 12 members graduated in 1826. Its annual receipts, including state appropriations, are about $250,000. There are collegiate and normal departments. The library includes about 35,000 volumes and the students number approximately 600, with as many more in the summer school.

OHIO STATE UNIVERSITY, at Columbus, chartered in 1870, was opened in 1873 as the Ohio Agricultural and Mechanical College. Five years later it was reorganized under its present name. Its site includes about 345 acres, of which 235 are for the experimental work in agriculture. This institution has received the Federal grants for agricultural and mechanical colleges. It main-

tains six colleges—art, agriculture and domestic science, engineering, law, pharmacy and veterinary medicine. It has a library of 100,000 volumes and about 3000 students.

**Ohm,** *Ome,* the unit which measures the resistance of a body to conducting an electric current. It is the same as the resistance offered at the freezing point of water by a column of mercury 106.3 centimeters long and having a cross section one square millimeter in area. The British ohm and the Paris legal ohm differ slightly from this but are not now in general use, the one above defined being the international ohm. The ohm was named after Prof. G. S. Ohm, a German investigator of electrical phenomena.

**Ohm, Georg Simon** (1787-1854), a noted German physicist, born at Erlangen, Germany, and educated in his native town. He taught mathematics and physics in several schools, and in 1817 became professor at Cologne. He gave particular attention to the relative conducting power of various metals, and discovered Ohm's Law, by which electric currents are now universally measured. He was director of the Nuremberg Polytechnic School from 1833 to 1849, and went from there to the chair of physics at Munich.

**Ohm's Law,** an important law of electricity which shows the relation of the current, the resistance to the current and the electromotive force. It states that the strength of the current increases and decreases with the electromotive force, but varies inversely as the resistance. In mathematical form the current in amperes is equal to the electromotive force in volts divided by the resistance in ohms. This law was first stated by Professor Ohm of the University of Munich.

**Oil City, Pa.,** a city of Venango Co., 132 m. n.e. of Pittsburgh and 18 m. from Titusville, on the Allegheny River, at the mouth of Oil Creek, and on the Erie, the Pennsylvania and the Lake Shore & Michigan Southern railroads. Oil City is one of the principal petroleum markets in the Pennsylvania oil regions, immense quantities of this commodity being bought and sold here. The town was settled in 1825, but did not become of any particular importance until 1860, when oil was first discovered in Oil Creek Valley. The city contains extensive oil refineries, oil-well supply factories, machine and boiler shops and manufactories of spokes and handles, explosives, tubes and tanks. The Allegheny River divides the city into two parts which are connected by several bridges. Oil City was incorporated as a borough in 1863 and in 1874 it received a city charter. Population in 1910, 15,657.

**Oilcloth.** See LINOLEUM.

**Oils,** thick, sirupy substances, liquid at ordinary or slightly higher temperatures. They are characterized by being lighter than water, in which they cannot be dissolved. Oils are classed, according to their sources, as animal, vegetable or mineral oils. Most of the oils of mineral origin are merely compounds of hydrogen and carbon, but vegetable and animal oils generally contain oxygen and sometimes other elements, as sulphur and nitrogen. The mineral oils are chiefly coal-tar products (See KEROSENE; GASOLINE; NAPHTHA; PETROLEUM). Familiar animal oils are sperm oil, cod-liver oil, goose oil, etc.

According to their actions, oils are classed as fatty, or fixed, and volatile, or essential, oils. The fatty oils are those which leave a permanent greasy stain and cannot be distilled without change of composition. These oils are found in animal fats. Volatile oils are those which vaporize easily and which, being commonly found in plants, give to plants their characteristic tastes and odors. Such oils are oil of wintergreen, mustard oil, oil of cloves, etc. They are frequently used in perfumes and as flavoring in foods. Oils, on being distilled, frequently give up gas which is used for heating or lighting purposes, and many are used in liquid condition as fuel.

**Ojib'way** (Ojibwa), or **Chippeway,** a tribe of North American Indians living

in regions surrounding lakes Huron and Superior. They were strong in numbers and belonged to the Algonquian family. There are now about 30,000 on reservations in the same region. After the War of 1812 they were friendly to the whites. They subsist chiefly on game.

**Okapi,** *O kah' pe,* a little-known animal of the Giraffe Family found in the densest forests of Africa. Its discovery, which occurred as recently as 1899, came about when exploring parties penetrated the forests of Uganda and found the ponylike animal with red-brown body, which the Pygmies called the okapi. The fore and hind limbs are white, marked with brown, horizontal stripes; its cheeks are yellowish-white and its nose and muzzle are brown. It has pointed ears, a somewhat elongated neck and a sloping body, which gives the forelegs the same appearance of length as have those of the giraffe. The male has backward-curving, giraffelike horns, but the female is hornless.

**Okechobee,** *O ke cho' bee,* a lake in the southern part of Florida. It is 40 m. long and about 25 m. wide and is the largest lake in the Southern States. It is shallow, being only 20 ft. deep, and is bordered by cypress swamps. Lake Okechobee is in the midst of the great swamp known as the Everglades, through which it finds an outlet to the sea.

**Okhotsk, *O kotsk',* Sea of,** a large arm of the Pacific Ocean indenting the east coast of Asia between the Peninsula of Kamchatka on the north and the Siberian coast on the south. The long chain of the Kurile Islands, a Japanese possession, forms its separation from the Pacific, while the Island of Sakhalin, partly Russian and partly Japanese, separates it from the Japan Sea. The Amur is the chief river flowing into it, and the seaports along its shores, once well known, are now of little importance. Its greatest depth is 2100 feet.

**O"klaho'ma,** THE BOOMER STATE, one of the West South Central States, is bounded on the n. by Colorado and Kansas, on the e. by Missouri and Arkansas, on the s. by Texas and on the w. by Texas and New Mexico. The Red River forms a large part of the southern boundary.

SIZE. The length from east to west not including the Panhandle is 310 m. The length of the eastern boundary is 213 m. and of the western boundary, 170 m. The area is 70,057 sq. m., of which 643 sq. m. are water. It is larger than any of the states east of the Mississippi River. Oklahoma is almost the exact size of North Dakota and a little smaller than Ohio and Indiana combined. It could contain all the New England States and Delaware, and is the 17th state in area.

POPULATION. In 1910 the population was 1,657,155. From 1900 to 1910 there was a gain in population of 866,764, or 109.7 per cent. There are 23.9 inhabitants to the square mile and the state's rank in population is 23. The population here given includes what was included in Oklahoma and Indian Territory in the census of 1900.

SURFACE. The surface in general is that of a rolling plain sloping gently to the southeast, but this plain is naturally divided into several surface regions. That part of the state north of the Canadian and Arkansas rivers has its surface deeply cut by the rivers flowing through it. In the central part of this region is a broad extent of open prairie.

The Ozark Mountains enter the state through the east about midway between the northern and southern boundaries and extend in a southwest direction nearly halfway across it. The Wichita Mountains extend in a southeast direction across the southwest corner, lying chiefly in Beckham, Greer, Kiowa and Comanche counties. These mountain ranges and their spurs give the southern part of the state a somewhat hilly and rolling surface, though they are not high mountains, the highest peaks not exceeding 1500 ft. The extreme northwestern part of the state is an elevated, rolling plateau which belongs to the Great Plains. The highest altitude, 4700 ft., is

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in the northwestern, and the lowest point, 315 ft., is in the southeastern corner of the state. These mountains constitute a connecting link between the Ozark Mountains of Arkansas and Missouri and the Rocky Mountains.

Rivers. The state is well watered by streams. Ten rivers cross Oklahoma. All the drainage is into the Mississippi through the Arkansas or the Red River. The chief tributaries of the Arkansas are the Grand, Verdigris, Poteau, North Canadian, South Canadian, Cimarron and Salt Fork. The tributaries of the Red include the Kiamichi, Blue and Washita. The general course of these streams is from northwest to southeast across the state. These streams are not navigable.

Climate. Oklahoma has a warm climate, but there is a marked contrast between the temperature of the western and of the eastern end of the state. The mean annual temperature of Oklahoma City, which is in the central part of the state, is 59°, with an average of 78° for summer and 38° for winter. The northwestern part of the state is cooler and drier than the other portions. The highest temperature ever recorded is 104°; the lowest, 17° below zero. The average rainfall for the entire state is about 38 inches, but it is much heavier in the eastern than in the western part. The cold season is short. The rivers tend to increase the moisture, so that the climate on the whole is suitable for agriculture in all parts of the state.

Minerals and Mining. The bituminous coal fields have an area of about 20,000 sq. m. and extend from the Kansas border southward nearly across the eastern end of the state. The most important mines are in Coal, Latimer and Pittsburg counties. The annual output is about 3,500,000 tons. Petroleum was discovered on the border of Indian Territory in 1890, and in 1903 a number of wells were bored in Bartlesville. During the last few years Oklahoma has led the United States in the production of petroleum and in 1911 produced 54,000,000 barrels of crude oil. Natural gas in large quantities is also found in the oil regions. There are extensive deposits of gypsum rock, which is used for cement, stucco and plaster, in a range of hills extending from the central part of the state northwest to the northern boundary. Quarries are worked in Blaine, Kay and Canadian counties. The glass-sand deposits are very important. Southern Oklahoma contains a ledge of glass sand, averaging 50 ft. thick and 60 m. long, which, on analysis, is found to be almost pure silica. There are deposits of asphalt in the central and southern parts of the state along the Canadian River, but they have not yet been extensively worked. Salt plains occur on the Canadian River in Woodward and Woods counties, as well as in Blaine County. Clay, lead, iron, copper and zinc are found in a number of localities. The granite deposits are among the finest in the country. Twenty or more varieties of shades and textures are found. The Wichita Mountains, 1000 ft. high and 60 m. long, in the southwestern part of the state, are composed entirely of granite. The value of the yearly output of all mineral products of the state is about $27,000,000.

Forests and Lumber. There are about 24,000 sq. m. of forests in the state. The larger part of the area is in the eastern section. In the western part forests do not occur except along the streams. The merchantable timber consists of black walnut, hickory, ash, elm, cottonwood, blackjack and pine, and what is locally known as post oak comes from what was formerly Indian Territory and is used to supply local needs. Lumbering is one of the leading manufacturing industries.

Agriculture. Oklahoma is admirably suited by soil and climate for agriculture and it constitutes the chief industry of the state. The average size of most of the farms is 160 acres, but there are many of less than 50 acres and a few over 500 acres. Some of the largest farms are owned by Indians who lease them to white men. Practically everything that is cultivated between the

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Canadian line and the Gulf of Mexico, and between the Atlantic Ocean and the Rocky Mountains, can be raised in Oklahoma.

*Soil.* In the east-central part of the state the soil is a clay loam of a dark red color. Along the rivers and in the bottom lands it is a dark alluvium. In each stream valley there is a broad belt of exceedingly fertile bottom land. The upland soil throughout the greater part of the state is also very fertile. In western Oklahoma much of the soil is red, which color is due to the large per cent of iron which it contains. Eastern Oklahoma has large areas of limestone soil.

*Products.* Corn, cotton and alfalfa are the chief field crops, and in the production of cotton Oklahoma has become one of the leading states. Other important field crops are hay, wheat, oats, kafir corn, sorghum cane, sugar cane, broom corn, castor beans and potatoes. Oklahoma is an excellent fruit state, and large quantities of apples, peaches, pears, plums, cherries and apricots are raised. The number of orchards is increasing each year. Grapes are also raised in large quantities, as are strawberries, raspberries, currants, gooseberries and other small fruits. Garden vegetables are raised in great variety, including cucumbers, melons, tomatoes and sweet potatoes. Pecans, walnuts and other nuts are abundant. Several irrigation projects are in operation in the northwestern part of the state, and as these are extended larger areas will be reclaimed.

Raising live stock is the oldest branch of agriculture in the state and it is still very important. The original breeds of cattle formerly so common on plains have very generally been replaced by breeds of a higher grade, and large numbers of excellent cattle are now found in the state. Horses, mules, hogs and sheep are also raised in large numbers for the Eastern markets. Dairying is an important and growing branch of animal husbandry. The state as a whole also derives a large income from poultry and eggs, and the amount of washed and unwashed wool obtained from the annual wool clip is very great.

Manufactures. The manufacture of flour and gristmill products and of lumber products constitute the leading manufacturing industries. Machine shops, cotton-gin works, foundries and repair shops for railway cars are established in a number of localities to meet local needs. At Oklahoma City are important meat-packing houses. The production of cottonseed oil and oil cake is an important industry in the southwestern part of the state. In those sections settled by Indians are found a number of industries peculiar to those people, such as making baskets, moccasins and beadwork. There are also fruit canneries, brick plants, agricultural-implement shops, salt works, cement and plaster works and flour mills. All of these taken together constitute an industry of fair proportions.

Transportation and Commerce. Trunk lines of railway cross the state from east to west and from north to south. Railway construction has not yet reached some of the western sections, but with this exception, railway facilities are good. Oklahoma City, Guthrie, Muskogee, South McAlester, Enid and Chickasha are important railway centers.

Oklahoma has a large commerce. Cotton, corn, fruits, vegetables and other agricultural produce, together with live stock, petroleum and gypsum, are exported. The imports consist of manufactured goods, foodstuffs not raised within the state and machinery.

Government. The constitution was adopted in 1907, when Oklahoma became a state. It contains many provisions which in the older states are left to legislative enactment. The executive department comprises the governor, lieutenant-governor, secretary of state, treasurer, auditor, superintendent of public instruction, examiner and inspector, commissioner of labor, commissioner of insurance, chief mine inspector, commissioner of charities and corrections, and president of the board of agricul-

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ture, each elected for four years. The governor, secretary of state and treasurer are not eligible for the next succeeding term.

The Legislature consists of the Senate and a House of Representatives. Senators are chosen for four years, one-half being elected every two years, and representatives are chosen for two years. Legislative sessions are held biennially in the even-numbered years. The referendum applies to legislation, and an act, or any part of an act, may be voted on at a general election when five per cent of the legal voters request that such vote be taken. Legislation may also be initiated by a petition signed by eight per cent of the voters.

The judicial department comprises a Supreme Court, consisting of six judges elected for six years; a Criminal Court of appeals, consisting of three judges elected by popular vote; 21 District Courts, each with one or more judges elected for four years; a County Court in each county, presided over by a judge elected for two years; and local courts, each presided over by justices of the peace, who are elected for two years. The cities have the usual police and municipal courts. In counties having over 25,000 inhabitants there is now provided a judge of Superior Court.

The state has taken advanced steps in safeguarding its citizens in their possessions of property and their personal rights. Husband and wife are equal in regard to property rights. A homestead of 160 acres of land in the county or one acre in a city, town or village cannot be sold at forced sale, unless it exceeds $5000 in value and providing the claims against it are not for purchase money, improvements or taxes. Public service corporations are under the control of a commission. There is also a state board of arbitration, whose duty it is to investigate lockouts, strikes and other labor troubles. The state maintains a rigid child-labor law, which prohibits the employment of children under 16 years of age in dangerous occupations. Another law forbids public officers to appoint relatives to any government position in a department in which they are in authority.

Education. An excellent public school system is maintained under the direction of the state board of education. This board consists of the state superintendent, who is ex officio chairman, and six members appointed by the governor. Local administration is by county superintendents and district boards, each board consisting of three members. Separate schools are maintained for white and colored children. In addition to instruction in the ordinary branches, instruction is required in agriculture, horticulture, animal husbandry, forestry, road building and domestic science. There is an agricultural school of secondary grade in each of the six Supreme Court judicial districts, and a state industrial school for girls, in which domestic science and the fine arts are taught. Normal schools are maintained at Edmond, Tahlequah, Ada, Durant, Weatherford and Alva. The state university is at Norman and the agricultural college at Stillwater, and at Langston is a normal university for colored youth. Oklahoma City is the seat of the Cary College, the Epworth University (Methodist), Draughon's Business College, Hill's Business College, St. Mary's Academy and several conservatories of music. The new high-school building, completed at a cost of $600,000, is one of the most modern buildings of its kind in the United States. The Chilocco Industrial School for Indians is located in Kay County.

State Institutions. The hospital for the insane is at Fort Supply; the school for the blind is temporarily located at Fort Gibson; and that for the deaf at Sulphur. The penitentiary is at McAlester, with a branch at Granite. The school for the feeble-minded is at Enid and the reform school at Pauls Valley.

Cities. The chief cities are Oklahoma City, the capital; Guthrie, Ardmore, Chickasha, Anadarko, Durant, Enid, Lawton, Muskogee, Pawnee, Shawnee, Tulsa, Wilburton, McAlester, Kingfisher,

Tecumseh, Hobart, Alva, Atoka, Stillwater, El Reno, Ponca and Blackwell.

History. Oklahoma (meaning beautiful country) was originally a part of Oklahoma Territory and Indian Territory, a grant of 1834 set aside for five Indian tribes, the Cherokee, Choctaw, Chickasaw, Creek and Seminole. Here the Indians were promised that they might, undisturbed, practice their tribal government. As the land assigned afforded more room than the Indians needed white adventurers made attempts at a foothold, but were denied citizens' rights by the tribal government. In 1889 the United States Government purchased this section from them, and opened it, Apr. 22 to settlers. To the 1,400,000 acres of Creek land and 500,000 acres of Seminole territory, over 50,000 persons rushed and filed claims the first day it was opened to settlement. Guthrie, with 10,000 inhabitants, was established at once. In 1890 Oklahoma Territory was organized. In 1906, by previous agreement, tribal government in Indian Territory ended. Congress then passed an enabling act joining Oklahoma and Indian territories, and arranging for their admission as one state. Oklahoma entered the Union Nov. 16, 1907. Guthrie, the capital of Oklahoma Territory, became the temporary capital of the state. The Supreme Court decision of Feb. 9, 1911, made Oklahoma City the seat of the state government.

Governors. Charles Nathaniel Haskell, 1907-1911; Lee Cruce, 1911-1915; R. L. Williams, 1915—. Governors are not eligible for immediate reelection.

**Oklahoma City, Okla.,** capital of the state and county seat of Oklahoma Co., on the North Fork of the Canadian River and on the Chicago, Rock Island & Pacific, the Missouri, Kansas & Texas, the Atchison, Topeka & Santa Fe, the St. Louis & San Francisco and other railroads. The city is situated at an altitude of 1247 ft. in a fertile agricultural region and occupies a position geographically in the center of the state. Within the city limits there are about 420 m. of streets, 117 m. being paved with asphalt; and 90 m. of street railway. The location of a number of gigantic meat-packing plants adjacent to the city on the south and southeast transformed a large area into an industrial addition, with an excellent street-car system, paved streets, modern residences, schools and churches. Oklahoma City has a boulevard 30 m. in extent encircling the city. Wheeler and Northeast parks are the largest of the 16 parks and squares, which aggregate a total of about 1860 acres. The city also contains a large Exchange Building, Federal Building, a Carnegie library, four private and two city hospitals, about 15 hotels, 18 banks, a number of theaters, over 30 public schools, one of the finest high schools in the West, costing $500,000, and about 40 churches and missions.

Cotton, broom corn, wheat, corn and oats are the staple crops of the surrounding region. Petroleum, natural gas and coal are important factors in the resources of the city. Among the manufacturing establishments are cotton-compress works, cotton gins, cottonseed-oil mills, packing houses, cracker factories, flour mills and about 200 factories which turn out finished products. Oklahoma City is an important jobbing center and has a large trade in live stock, fruit and farm products. A large colony was established on the site of the present city on Apr. 22, 1889, the day on which the country was, by proclamation, declared open for settlement. The seat of the state government was changed from Guthrie to Oklahoma City on Feb. 9, 1911. Population in 1910, 64,205.

**Oklahoma, University of,** at Norman (1892). Supported from the income derived from generous land grants, and by a state tax of one-half mill, the University of Oklahoma has made rapid progress. It maintains schools of the arts and sciences, of medicine, applied science, pharmacy, mines and fine arts. Its library contains upwards of 20,000 volumes. The enrollment is about 1000.

**Oldenburg,** *Ole' den boork,* a grand duchy of the German Empire, comprising the Duchy of Oldenburg, and the two principalities, Birkenfeld and Lübeck. It

includes four-fifths of the total area and population of the state, and has an area of 2481 sq. m. It is bounded on the n. by the North Sea, on the e. by the Prussian Province of Hanover and the State of Bremen and on the s. and w. by Hanover. Heaths, moors and marsh lands cover a large part of the territory, and near the coast the land needs to be artificially protected from the sea. The principal rivers are the Weser and its tributary, the Hunte, and the Ems, with its tributaries, the Haase and Soeste. Except for the humid atmosphere of the moors, the climate is favorable for vegetation, and cereals, potatoes, beans, rape and hay represent the principal crops. Stock breeding is an important industry, and the chief manufactures are woolen yarn, knit goods, linoleum, brick, corks and tobacco.

The throne of the grand duchy is hereditary in the male line. The constitution is one of the most liberal in Germany and provides for a representative assembly of one chamber, allowing one deputy for every 10,000 inhabitants, and consisting of 40 members. The assembly meets every three years. One member represents Oldenburg in the Bundesrat, and three deputies are returned to the Reichstag. Separate budgets are maintained for each of the three divisions, but a common budget for the grand duchy also exists. The capital is Oldenburg. The territory was early inhabited by the Germanic tribe known as the Chauci, later merged with the Frisians. A Count of Oldenburg is referred to by history as having lived in the 13th century. The Reformation was quickly accepted. In 1667 the duchy passed into the hands of Denmark, and in 1777 it was made a duchy, while the Congress of Vienna increased its territory in 1815 and raised it to the rank of a grand duchy. It became a part of the new German Empire in 1871. Population, about 440,000.

**Old Forge, Pa.,** a city of Lackawanna Co., 4 m. s.w. of Scranton, on the Lackawanna River and on the Lehigh Valley and the Delaware, Lackawanna & Western railroads. The city is situated in the anthracite regions of the Lackawanna Valley, and the chief industries, besides the mining and shipping of coal, are glass blowing, making chemicals and fertilizers and manufacturing silk goods. Old Forge was settled in 1830 and incorporated in 1899, having been organized from a part of the township of the same name. Population in 1910, 11,324.

**Old Ironsides.** See CONSTITUTION, THE.

**Old South Church,** a famous church on Copley Square, Boston, built about 1730, on the site of a church previously erected in 1669. The land upon which Old South stands was known as Governor Winthrop's "Green." In Revolutionary times the church was the scene of such meetings as earned it the name of the "Sanctuary of Freedom," and during the siege of Boston it was turned into a riding school by the British troops. Today it serves as a museum, mostly of Revolutionary relics and portraits; and as a lecture hall, being used by "The Old South Lectures to Young People" for historical and patriotic purposes.

After the great fire in Boston in 1872 the church was in imminent danger of removal, since the buildings around were all destroyed and it was an obstruction to the new plans for rebuilding. Oliver Wendell Holmes, however, wrote his famous poem *An Appeal for "the Old South,"* and saved the historic structure.

Full sevenscore years our city's pride—
The comely Southern spire—
Has cast its shadow, and defied
The storm, the foe, the fire;
Sad is the sight our eyes behold;
Woe to the three-hilled town,
When through the land the tale is told—
"The brave 'Old South' is down!"

In bridal garlands, pale and mute,
Still pleads the storied tower;
These are the blossoms, but the fruit
Awaits the golden shower;
The spire still greets the morning sun,—
Say, shall it stand or fall?
Help, ere the spoiler has begun!
Help, each, and God help all!

**Olean,** *O" le an',* **N. Y.,** a city in Cattaraugus Co., 70 m. s.e. of Buffalo, on the Allegheny River at the mouth of

Olean Creek and on the Erie, the Pennsylvania and the Pittsburgh, Shawmut & Northern railroads. Olean is noted for its extensive oil and lumber interests. Owing to its proximity to the Pennsylvania oil fields it is a storage place for great quantities of petroleum and is the terminus of several pipe lines. The industrial establishments include oil refineries, planing mills, tanneries, carriage works, railroad shops, glass-cutting factories, breweries, marble works, foundries, etc. Olean was settled in 1804 and chartered as a city in 1893. Population in 1910, 14,743.

**O"lean'der,** a small tree of the Dogbane Family, cultivated in greenhouses or as an ornamental shrub. The juice is slightly milky and poisonous; the leaves are leathery and stiff and marked with rigid veins. The flowers are showy and grow in long clusters. The individual blossoms are tubular and may be white, rose, variegated or streaked in color and single or double in form. One variety has fragrant flowers, but ordinarily they are scentless. The tree grows to a height of six or eight feet, but is a somewhat tender plant, which will not endure the winters of northern United States. If kept within doors it must be allowed to "sleep" through the winter, as it does not thrive well without an occasional resting period. The oleander is a native of India, where the Hindu, though fearing its poisonous qualities, decorates his temples with its beautiful blossoms.

**Olefiant,** *O' le fi" ant,* **Gas,** a gas made by heating a mixture of two parts of sulphuric acid and one part of alcohol. It is colorless and tasteless and has an odor resembling that of the oil of caraway. It burns with a bright flame, but is of no practical use except for experimental purposes in laboratories.

**Oleomargarine,** *O" le o mar' ga reen,* a fat made from oleo oil, milk and cream and used as a substitute for butter. The oleo oil is obtained from the leaf tallow of beef. The tallow is first cleaned and cooled, afterwards cut up, then heated in a steam-jacketed caldron to about 150° F. When cooled, it is placed under pressure to force out the oil from the stearin, which is one of the purest of fats. The oil is yellow in color and has an agreeable taste. Certain proportions of thin milk and cream, with a little butter, are added and the whole mass is churned; afterwards it is worked, salted and packed in buckets or rolls. Hog fat and cottonseed oil are sometimes substituted for beef tallow, but these make an inferior quality of oleomargarine. When the best oleo oil is employed, the product is wholesome and nutritious. It does not become rancid and is a good substitute for butter, especially in cooking. All substances entering into it are carefully examined by government inspectors, and the oleomargarine is again inspected before being placed on the market. To protect the dairy interests, Congress, in 1902, placed a tax of ten cents a pound on oleomargarine that was colored like butter, and an equal tax on renovated butter. See BUTTER.

**Oliphant,** *Ol' i fant,* **Mrs. Margaret** (1828-1897), an English novelist and miscellaneous writer, born in Wallyford, Scotland. Forced to support herself and three fatherless children, she earned her livelihood by writing and produced novels characterized by insight and tender humor, and critical and historical studies of great variety. Her works embrace *Adam Graeme, Magdalen Hepburn, The Makers of Florence* and *The Literary History of England from 1790 to 1825.*

**Olive,** a family of shrubs and trees including the common lilac and the historic olive tree. The latter is a native of Asia Minor and Syria and is among the most useful of all trees It is a large tree with rugged bark, and though it grows slowly it generally attains a height of from 25 to 40 ft. It is exceptionally long-lived and some individuals still growing are said to be fully 1000 years of age. The leaves are gray-green, a shade now known as olive green, and are leathery in texture, smooth above but scaly underneath. The flowers are small and white and grow in long clusters in the joints of the leafstalks. The fruit,

which is familiar through the use of bottled olives, is a stone fruit, and when unripe has the same shade as the leaves; ripe, it is a rich purple-brown.

The olive grows in a dry, warm climate and is especially common in the countries bordering upon the Mediterranean, where the fruit is an important food product. It was introduced into California from Mexico by Spanish missionaries, and the variety most common there is still called the mission olive. The fruit is made use of both ripe and green, in which forms it is pickled by a lengthy process, and is bottled for shipment to all parts of the United States. In Italy and Greece dried olives are an important article of food. The oil, used everywhere as a food and a medicine, is obtained by crushing the fruit and pressing it in stone or bronze mills. It is carefully cleansed before using. The lower grades of oil are used for illuminating and lubricating purposes and in the manufacture of soap. Another kind of oil, made from the fermented fruit, is used in dyeing. The extensive use of olive oil is responsible even for the name *oil,* which is derived from the Latin name of the tree, *olea.* The wood is hard, has a beautiful grain and is susceptible of a high polish. Its roots are also finely marked and, with the trunk wood, are valuable for cabinetwork.

The olive is often spoken of in Biblical history: its branches were brought by the dove to the ark; its wood was used in the construction of the Temple at Jerusalem; the Mount of Olives was so named because of the orchards upon its slopes; and the name Gethsemane means oil press. The olive figures in classic legend as sacred to Pallas Athene. The victor in the Olympian games was crowned with olive leaves, and the branch was, and still is, the emblem of peace.

**Olive Oil,** an oil extracted from the fruits of the olive tree. The olives are gathered as soon as picked and put under pressure, when they are reduced to a pulp and the oil is expressed. This pulp is re-pressed several times, the oil deteriorating with each operation. The oil is filtered, refined and clarified until it becomes a golden-yellow, and it is then suitable for the table. Italy has long been noted for its olive oil, but California is now producing large quantities of the highest grade. Peanut oil and cotton-seed oil are largely used as substitutes and adulterants for olive oil. See OLIVE.

**Ol'iver Op'tic.** See ADAMS, WILLIAM TAYLOR.

**Olives, Mount of,** or **Mount Olivet,** a mountain lying to the east of Jerusalem, from which it is separated by a narrow ravine known as the Kedron Valley. The abundance of olive trees growing on its slopes gave it its name. It is about 2600 ft. in altitude and its ridge is marked by three distinct summits. Mt. Olivet is of exceeding interest because of its sacred associations. On its slopes Christ talked to his disciples, round its eastern and southern side lay the road on which he made his triumphal entry into Jerusalem, at its base, in the Garden of Gethsemane, he suffered and prayed, and from the mountain he ascended to heaven.

**Olmsted,** *Om' sted,* **Frederick Law** (1822-1903), an American landscape architect, born at Hartford, Conn., and educated at Yale and Amherst. He early engaged in farming, but, following extensive travels in Europe and America, became landscape architect and superintendent of Central Park, New York City. During the Civil War he rendered efficient service as secretary of the United States Sanitary Commission. He aided in planning many of the largest parks of New York, Brooklyn, Boston, Montreal, Chicago and Milwaukee, the grounds of the Capitol at Washington and features of the Columbian Exposition in Chicago. Moreover, he wrote largely on agricultural methods and phases of landscape gardening.

**Ol'ney, Richard** (1835- ), an American statesman, born at Oxford, Mass. He graduated at Brown University in 1856, studied three years at Harvard Law School, and began a successful practice in Boston. In 1874 he became a member of the State Legislature. His service here was brief, however, because

of the demands of his extensive law practice. In 1893 he was appointed attorney-general of the United States by President Cleveland, and two years later he became secretary of state. His administration of these public affairs was characterized by ability of a high order. He was tendered the position of ambassador to Great Britain by President Wilson, but declined.

**Olympia,** *O lim' pi a,* **Wash.,** the capital of the state and county seat of Thurston Co., situated on Puget Sound, 65 m. from the Pacific Coast, 100 m. n. of Portland, Ore., and on a branch of the Northern Pacific Railroad. The city is located on a peninsula with mountains on each side and occupies a site of remarkable beauty. The capitol, governor's residence and courthouse and the new Temple of Justice are the most prominent public buildings. The Temple of Justice is the first of a group of government buildings being erected on Capitol Place on Budd Inlet. The group will include the new capitol and several office buildings, and when completed will form one of the finest groups of state buildings in the Union. The chief industries include the manufacture of pottery, lumber, shoes, soap and lumber products. The city has many beautiful residences, paved streets and an electric-railway system, and enjoys a prosperous trade with the surrounding country. Population in 1910, 6996.

**Olympian Games,** athletic events originally held in a now celebrated stadium on the plain near Mt. Olympus in Greece. The somewhat informal contests of very early times gradually won favor, and by 776 B. C. Sparta joined other peoples of the Peloponnesus in keeping a regular catalogue of the Olympic victors. The games were held every four years; hence the period of time between two series of games came to be known as an Olympiad. From about 572 B. C. the Olympic games were of interest throughout all Greece, and everywhere her people accepted the belief that by harmonious discipline of both mind and body men show highest honor to Zeus. At first there was but one contest, a foot race. Subsequently the number of events was increased to 24. In the times of Roman supremacy the games were first thrown open to competitors not native Greeks.

After nearly 13 centuries these games were forbidden by the Emperor Theodosius, in 394, but were revived after 15 centuries had elapsed, and celebrated at Athens in 1896. Members of the royal family of Greece participated in efforts for the revival of interest in such contests, and a stadium seating 70,000 people was constructed. The famous long-distance foot race from Marathon to Athens attracted special attention. This is commemorative of the famous runner who in ancient times gave his life in bringing to Athens news concerning the defeat of the Persians. Subsequent celebrations of the games occurred at Paris in 1900, St. Louis in 1904, Athens in 1906, London in 1908 and Stockholm in 1912. See STADIUM.

**Olympus,** *O lim' pus,* the ancient name of several mountains or mountain chains. The most famous of all is the range dividing Thessaly and Macedonia. Its highest peak, particularly called Olympus, is over 9700 ft. above sea level. It was fabled to be the home of the gods, who dwelt not only upon the mountain but also above it.

**Olyphant,** *Ol' i fant,* **Pa.,** a city of Lackawanna Co., 4 m. n.e. of Scranton and about 9 m. from Carbondale, on the Lackawanna River and on the Delaware & Hudson and the New York, Ontario & Western railroads. It has large collieries and is situated in an important anthracite field. There are extensive blasting-powder mills, machine shops and ironworks, but the chief industry is coal mining and shipping. Olyphant was settled in 1857 and incorporated in 1877. Population in 1910, 8505.

**Omaha,** *O' ma hah",* a tribe of North American Indians. They belonged to the Sioux family and were found by Marquette in 1673 in Minnesota and Iowa. They now live in Nebraska, having left their villages in the Northern States be-

cause of a smallpox epidemic. They are agricultural and number about 1200.

**Omaha, Neb.,** commercial metropolis of the state and Missouri River Valley, county seat of Douglas Co., 492 m. s.w. of Chicago, on the west bank of the Missouri River, 18 m. above the mouth of the Platte River, and on the Chicago & North Western, the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Illinois Central, the Chicago, Milwaukee & St. Paul, the Union Pacific, the Wabash, the Chicago Great Western and other railroads. A number of bridges over the Missouri River connect the city with Council Bluffs, Iowa. The city has a fine system of street railways, which give excellent service to the attractive suburbs of Florence, Benson, Ralston and Dundee, as well as various resorts, which include Lake Manawa on the Iowa side of the river. Omaha is the center of the great corn- and wheat-producing belts of Iowa and Nebraska, and, together with South Omaha, forms one of the largest meat-packing centers of the country. Omaha is the headquarters of the United States Military Department of the Missouri, and military posts are located at Ft. Crook and Ft. Omaha near the city.

Parks and Boulevards. The public parks of the city are connected by a fine boulevard system of 28 m., and comprise a total area of over 941 acres. The largest parks include Hanscom, Riverview, Bemis, Levi Carter, Krug, Miller and Elmwood. Three country clubs and golf grounds are located within the limits of the city. The finest residential districts extend over the hills and bluffs, while the portions of the city adjacent to the river are given over wholly to commercial and industrial interests. Farnam, Douglas, Leavenworth and Dodge streets extend almost the entire length of the city from east to west. The main avenues are wide, well-paved and profusely shaded.

Public Buildings. Among the noteworthy buildings are the courthouse, costing $1,350,000; Federal Building; city hall; a public library; the Auditorium; the Omaha National Bank, the Bee, the Y. M. C. A. and Y. W. C. A. buildings; City National Bank and Union Pacific buildings, each 16 stories; the Woodmen of the World Building of 18 stories; hotels, fine business blocks and 99 handsome churches, which include a Protestant Episcopal and two Catholic cathedrals. The city is the seat of a Catholic see and of an Episcopal bishopric.

Institutions. Among the leading educational institutions are a state school for the deaf, the medical department of the University of Nebraska, the Presbyterian Theological Seminary, opened in 1891, Brownell Hall, Academy of the Sacred Heart, St. Catherine's Academy, Omaha University and Creighton University (Catholic). Creighton University was founded in 1879 in honor of Edward Creighton. There is an excellent system of public schools, including two high schools, one of which is among the finest in the country and cost $1,275,000. The benevolent and charitable institutions include St. Joseph's Hospital (Catholic), built as a memorial to Count John A. Creighton, brother of Edward Creighton, who gave $1,250,000 in his will to found scientific and other departments of Creighton University; the Presbyterian, Methodist and Immanuel (Swedish) hospitals and numerous private institutions.

Industries. Owing to the railroad connections and its central position in a great agricultural and stock-raising country the city has had a rapid growth. Omaha assumed second place in the world's markets during 1912 as a live-stock center. The manufacturing establishments include breweries and distilleries, smelting and refining works for silver and lead, large railway repair shops and flour and grist mills. Meat packing began in 1871, but the removal of the stockyards to South Omaha in 1884 caused a city of considerable size to grow up around them (See South Omaha, Neb.). Other manufactures include linseed oil, boots and shoes, white lead, brick, wagons and carriages, carbonated products, whips, harness,

electrical machinery, structural iron, hotel supplies, boilers and steam engines. There is an important trade in live stock, lumber, grain and farm products. The creamery-butter output aggregates 20,000,000 lb. annually.

HISTORY. The first permanent settlement was made in 1854, and the growth of the city was greatly advanced by the construction of the Union Pacific Railroad, work on which was begun in 1864. Omaha was named from the Omaha Indians. From June 1 to Nov. 1, 1898, the Trans-Mississippi and International Exposition was held here. Population in 1910, 124,096.

**Oman,** *O mahn',* **Gulf of,** an arm of the Arabian Sea, separating Persia from Oman on the Arabian Peninsula. The Straits of Ormuz connect it with the Persian Gulf. Maskat, in Oman, is its only important port.

**Omar Khayyám,** *O' mar Ki yahm',* ( ?-about 1123), a great Persian mathematician, astronomer, philosopher and poet, born at Nishapur. He is supposed to have derived the epithet *Khayyám* (the tent maker) from his father's trade. He was well educated for his time, and had a remarkable memory. As a youth he formed a close friendship with Nizamul-Mulk, who, when he became vizier, bestowed on Omar an annual stipend amounting to about $3000. He was thus enabled to devote himself to study, with the result that his standard work on algebra raised him to the foremost rank among mathematicians of his day, and he was appointed court astronomer. With seven other scientists he reformed the calendar, the new reading dating from March 15, 1079. Omar's scientific fame, however, is surpassed by his poetical renown, and this is due to his epigrams written in the form of quatrains, some 500 of which go to make up a work entitled the *Rubáiyát.* Many of these epigrams are bitter in denouncing the narrowness and hypocrisy of religion, some voice a passionate protest against inevitable fate and others sing the praises of wine, love and pleasure. A portion of them have been translated freely into English verse by Edward FitzGerald.

**Om'nibus,** a name given to a four-wheeled vehicle similar to an enclosed carriage, having a long body with a strong roof. The seats are usually arranged along the sides, with a passage way between in the center. Protection against the weather is secured by having glass windows around the exterior. Previous to the introduction of street railways, omnibuses were in general use for transporting passengers, but in the United States they are now employed principally in small towns to convey passengers and hand baggage from depots to hotels. Some are large enough to carry 50 passengers inside and on top. In London, Paris and other large European cities, omnibus lines are still common.

**Omnibus Bill.** See COMPROMISE OF 1850.

**Omsk,** a city of Russia, the capital of the Province of Akmolinsk, situated in western Siberia at the confluence of the Irtysh and Om rivers, and on the Trans-Siberian Railway. Here are a military school for Cossacks and several academic institutions, some of them founded by the society for education organized for this purpose. The industrial plants include railway workshops, a steam sawmill and tanneries. It is an important military station, and the "fort" of Omsk was erected in 1716. Population in 1909, 88,900.

**One'ga, Lake,** the second largest lake of Russia, situated 85 m. n.e. of Lake Ladoga. It is 140 m. long, from 30 m. to 40 m. wide and has an area of 3670 sq. m. The shores are very irregular and are generally rocky. The water is cold and clear and abounds in fish There are numerous islands in the lake, and navigation is also obstructed by shoals and sand bars. Numerous streams flow into the lake, and it discharges its waters into Lake Ladoga by the Svir. By means of a canal which joins the Vytegra and the Kayla, Lake Onega has communication with the basin of the Volga.

**Oneida,** *O ni' da,* a tribe of North American Indians once living in the vicinity of the lake in New York State bearing the same name. They belonged to the Iroquois confederacy but were friendly to the French and the Americans rather than the English. They now live in a civilized state in Green Bay, Wis., in Ontario and in New York State. See IROQUOIS.

**Oneida, N. Y.,** a city of Madison Co., 26 m. e. of Syracuse, on Oneida Creek and on the New York Central & Hudson River and the New York, Ontario & Western railroads. Oneida Castle, the ancient seat of the Oneida Indians, is in the vicinity, and two miles south is the Oneida Community, which was converted in 1881 into a joint-stock industrial company. Oneida has many points of interest and fine residences. Its industrial interests are represented by ironworks, knitting and planing mills and manufactories of flour, hosiery, wagons, furniture, steel and wood pulleys and cigars. Silverware is extensively made at the Oneida Community. Large quantities of hops and dairy products are exported from this place. The first settlers came in 1834 and Oneida was chartered as a city in 1901. Population in 1910, 8317.

**Oneonta,** *O" ne on' ta,* **N. Y.,** a city of Otsego Co., 61 m. n.e. of Binghamton, on the Susquehanna River and on the Delaware & Hudson and the Ulster & Delaware railroads. The construction and repair shops of the Delaware & Hudson Railroad are located here. It is the seat of the Oneonta State Normal School and the Aurelia Fox Memorial Hospital. It has silk and planing mills, foundries, machine shops and glove and cigar factories. Oneonta was settled in 1800 and received its city charter in 1885. Population in 1910, 9491.

**Onion,** *Un' yun,* a garden vegetable of the Lily Family, known for its strong odor and sweet though biting flavor. The plant itself, which grows from seed or from young sets, has fibrous roots extending from a coated bulb, tall, cylindrical leaves and clusters of pretty pink- or blue-tinted flowers. In the spring the young onions are a spicy addition to table fare. Other onions which form more solid, sweeter bulbs are allowed to grow longer and sometimes attain a weight of two pounds or more. The large Spanish onion, the white Bermudas and the Strassburgs are the favorites. The raising of onions is an extensive industry in many farming districts of the United States, since the onion is one of the most widely used of flavorings. In most states the legal weight of onions is 57 lb. per bushel.

**On"onda'ga,** a tribe of North American Indians formerly living near Lake Onondaga, N. Y. They were one of the tribes of the Iroquois confederacy and were the guardians of the council-fire. They were a peaceful tribe, and many became converts to Christianity. The majority live in Canada on a reservation near Grand River, Ontario. Others remain on the reservation in New York State. See IROQUOIS.

**Onta'rio,** a province of the Dominion of Canada, bounded on the n. by Hudson Bay, James Bay and Quebec, on the e. by Quebec, on the s. and s.w. by the United States and on the w. by Manitoba. Most of the south and southwest boundary is formed by a line marking the deepest channel in the Great Lakes. The province is irregular in form. The greatest length east and west is 1000 m. and its greatest breadth, from Lake Erie on the south to Hudson Bay on the north, is about 1000 m.; its area is 407,262 sq. m., of which 40,354 sq. m. are water, including the Canadian portion of the Great Lakes. It is the second province in area, being more than three times as large as the United Kingdom and more than six times as large as the New England States. Population in 1911, 2,523,358. It is the most populous of the provinces, and nine-tenths of its inhabitants live on 1/15 of its area, the region lying between the Ottawa and St. Lawrence rivers and the Great Lakes.

SURFACE. A rocky ridge, known as the Niagara escarpment or, in the locality, as the "mountain," extends from

Queenston Heights near Niagara Falls to Hamilton at the head of Lake Ontario, thence northwest to Bruce Peninsula in Georgian Bay. This ridge divides the southwest part of the province into two sections. That to the west has elevations varying from 600 to 1700 ft., but is low along the Detroit and St. Clair rivers. The section to the east is generally rolling, with elevations varying from 400 to 1000 ft. The region between Lake Ontario and the Ottawa River is rolling, with occasional low hills. The great northern part of the province, sometimes known as New Ontario, is a table-land with an uneven surface, but no high altitudes. The northern shores of Georgian Bay and Lake Superior are in many places bold and rocky. Most of this northern region is heavily timbered.

Rivers and Lakes. The Ottawa and the St. Lawrence are the largest rivers in the eastern part of the province. The French River, the outlet of Lake Nipissing, and the Severn, which drains Lake Simcoe, flow into Georgian Bay. The St. Mary's, connecting lakes Superior and Huron, belongs to both Canada and the United States, as do the St. Clair and Detroit rivers. The St. Mary's is famous for its rapids at the outlet of Lake Superior and for its many beautiful islands. The streams flowing into Lake Superior from the north form beautiful cascades, where they descend the bluffs to reach the level of the lake. These falls constitute valuable sites for water power. Kakabikka Falls on the Kaministiquia develop electric power used in Fort William and Port Arthur. The entire province is well supplied with rivers and lakes.

Although innumerable small lakes are scattered through the province, only a few claim attention. These are Lake Nipigon, 70 m. long and 50 m. wide; Lake Nipissing, 55 m. long and 20 m. wide; the Muskoka Lakes, which are frequented by summer tourists; and Lake Simcoe. Georgian Bay is estimated to contain over 30,000 islands, most of them small, but the Great Manitoulin, 80 m. long and 30 m. wide, is the delightful home of a number of Indian tribes. All the islands are covered with verdure, making the bay one of the most attractive portions of the Great Lakes. Thousand Island Park in the St. Lawrence begins just as the river leaves Lake Ontario, and extends for about 50 m. It is also an attractive water park, whose natural beauty has been enhanced by the many attractive summer villas erected upon the islands.

Climate. In the northern part of the province (New Ontario) the winters are long and cold, but clear and bracing. The summers are cool and delightful, with occasional hot days. In the region between Georgian Bay and the Ottawa River there is usually a heavy fall of snow, but the winters are less severe than farther north. The summers are warm and sometimes hot. The peninsula between lakes Erie and Ontario has an equable climate owing to the presence of these bodies of water. The winters are mild and the summers long, with an average temperature higher than in other parts of the province. Throughout the province there is ample rainfall, varying from 30 to 40 inches throughout the year; and without exception the climate is healthful.

Minerals and Mining. In the peninsula between lakes Erie and Ontario are petroleum wells, which yield about 10,000,000 imperial gallons yearly. The yield has been gradually lessening for a number of years. Natural gas is produced from the greater part of the northern shore of Lake Erie and shows an increased supply from year to year. Salt and gypsum also occur in this peninsula. There are no other economic minerals in the southern part of Ontario. At Sudbury, north of Georgian Bay, are the largest nickel mines in the world; from them about one-half of the world's supply is obtained. Copper in paying quantities is also obtained in the reduction of the nickel ore. In the northern part of the province ores containing gold, silver, nickel, cobalt, arsenic, antimony and molybdenum are found. The extensive deposits of silver and cobalt ore near

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Lake Timiskaming have recently led to developing extensive mining operations in this region. Large deposits of corundum also occur in the Valley of the Ottawa. Around Thunder Bay and on Silver Islet in Lake Superior are some of the oldest silver mines in the Dominion. From the mine on Silver Islet over $3,250,000 worth of silver has been taken, but since 1903 little work has been done in this region other than that of prospecting and testing. Iron ore occurs in a number of localities, and Ontario supplies two-thirds of the iron produced in the Dominion.

Forests and Lumbering. The province has extensive forests. White pine and spruce are the trees of greatest commercial importance, though hemlock, fir and several varieties of hard wood are found. Lumbering is one of the leading industries of the province. The chief operations are carried on along the upper part of the Ottawa River and in the vicinity of Parry Sound. The river and lakes furnish excellent transportation facilities and large quantities of lumber are produced, Ontario ranking first in this industry. There are also many pulp mills in the lumber regions. Most of their product is made from poplar and spruce.

The provincial government maintains a department of forestry, which cooperates with the Dominion department in preventing forest fires, reforesting denuded areas and checking the ruthless waste of lumbermen.

Agriculture. Agriculture is the chief industry of the province and three-fourths of the inhabitants are engaged in it. Most of the farms that have been developed are in the southeastern part of the province and are worked by their owners. Until recently it was supposed that the great northern section (New Ontario) was worthless for farming purposes, but a more complete survey of this region shows that there are extensive areas of excellent agricultural land and that the timber on it is of sufficient value to pay for the clearing. Moreover, the climate of the region is suitable for raising all the hardier cereals and vegetables and large quantities of forage. In Old Ontario the soil is of a high degree of fertility, and the temperature and rainfall are very favorable to all kinds of mixed farming and to dairying and the raising of live stock. Ontario is noted for its excellent breeds of cattle, horses and hogs and also for the quantity and quality of its dairy products, which are manufactured in cheese factories and creameries. Wheat, oats, barley, peas, potatoes and hay are the staple crops. Garden vegetables, apples and small fruits are grown throughout this part of the province, and in the Niagara Peninsula large quantities of peaches, plums and grapes are raised. In general, scientific methods and the most modern implements and machinery are employed. The provincial department of agriculture renders the farmers most valuable assistance in promoting the introduction of new branches of the industry, in finding markets for the products and in maintaining an agricultural college and experimental farm at Guelph.

Manufactures. The abundant water power supplied by the many rapid streams, the presence of raw material and the demands of a rapidly growing market have led to a rapid development of manufactures. The chief industries are related to lumber and lumber products. There are numerous flour mills in the older part of the province, and in the large cities and towns are tanneries, woolen mills, foundries and machine shops, breweries and distilleries and, in some railway centers, construction and repair shops. The manufacture of agricultural implements is rapidly increasing and the output of textile and paper mills is yearly becoming of greater value as a source of income.

Other Industries. The fisheries on the Great Lakes furnish employment to a large number of people and are valued at over $2,500,000 yearly. In the extensive forests of the north are many fur-bearing animals, and hunting and trapping afford a good source of income in this region.

Transportation and Communication. At Sault Ste. Marie are the largest canal locks in the world, which afford passage to the largest steamers on the Great Lakes (See Sault Ste. Marie Canals). The St. Mary's and St. Clair rivers have been canalized, so that boats having a draught of 21 ft. can pass from Duluth to Buffalo. By means of the Welland Canal (See Welland Canal) and canals around the rapids in the St. Lawrence, boats drawing 14 ft. can pass to and fro between the Great Lakes and Montreal. The Rideau Canal extends from Ottawa to Kingston and forms a short route between Lake Ontario at this point and the Ottawa River. The entire southeastern part of the province is amply supplied with railways, which extend through it in all directions. All lines are under the control of the Canadian Pacific, the Canadian Northern and the Grand Trunk System. The main line of the Canadian Pacific passes along the northern shore of Lake Superior into Manitoba, and north of it the Grand Trunk Pacific has opened a great region to settlement. Excellent mail, telegraph and telephone facilities are found throughout the settled portions of the province.

Government. The chief executive is the lieutenant-governor, appointed by the governor-general of Canada in council for five years. He is assisted by an advisory council consisting of the heads of the departments of the provincial government and appointed by himself. The Legislature consists of an Assembly of 106 members, chosen by the qualified voters of the province. The judges of the courts are appointed by the Dominion Government for life. The Assembly has power to legislate upon all matters pertaining exclusively to Ontario, provided their acts conform to the constitution of the Dominion and the acts of the Dominion Parliament.

Education. Ontario has an excellent system of public schools, which are supported by provincial grants and local taxation. There is a minister of education who is a member of the advisory council, and a provincial superintendent, with ample executive powers. The qualifications for teachers of elementary schools are unusually high, and the province supports normal schools in a number of cities; also two faculties of education, one at Toronto in connection with the University of Toronto and the other at Kingston in connection with Queen's University, for the preparation of teachers. Attendance at public and separate schools between the ages of 8 and 14 is compulsory and the law is strictly enforced by truant officers. The schools are nonsectarian, but both Roman Catholics and Protestants have the right to maintain separate schools upon demand of not less than five families in any district. High schools and collegiate institutes are found in the cities and larger towns. The elements of agriculture are taught in the rural schools, and many of them have school gardens in which the principles taught in the classroom can be applied. The University of Toronto is at the head of the educational system, and the elementary and secondary schools are affiliated with it, as are most of the denominational universities. Among the leading institutes are Victoria University, Upper Canada College, Knox College, Wycliffe College, Huron College and St. Michael's College. The agricultural college at Guelph is considered one of the best in North America. There are a dairy school and a school of mines at Kingston, a school for the deaf and dumb at Belleville and one for the blind at Brantford.

Cities. The chief cities are Toronto, the capital; Ottawa, the capital of the Dominion; Hamilton, London and Kingston.

History. Samuel Champlain visited the country in 1615 and was probably the first white man to enter it. The French established friendly relations with the Huron Indians, and the Jesuit missionaries founded a number of stations among them, but the Iroquois practically destroyed the Huron nation and depopulated the country. Ft. Frontenac, on the site of Kingston, was built in

1673, and a trading station was established on the site of Toronto in 1749, but there was no systematic attempt to develop the country until after it became a British possession in 1763. In 1783 a large number of Loyalists from the United States entered the province and determined very largely the character of its institutions. During the war between Great Britain and the United States, 1812-1814, battles occurred at York, now Toronto, on the Thames River at Moraviantown, at Queenston and at Lundy's Lane. In 1837 a rebellion broke out as a protest against local governmental conditions. It was soon put down and the leader, William L. Mackenzie, fled to the United States. In 1791 Canada was divided into two provinces, Upper and Lower Canada, by the Constitutional Act. In 1841 these two provinces were united and formed one province known as Canada. This continued until 1867 when Canada and the provinces of Nova Scotia and New Brunswick were united to form the Dominion of Canada, the province formerly known as Upper Canada being called Ontario and that known as Lower Canada being called Quebec. Since the formation of the Federation, Ontario has been remarkably prosperous.

**Onyx,** *On' ix,* a hard variety of agate composed of layers, usually curved, of white alternating with red (sardonyx) or gray (chalcedony); the colors black, green and brown also occur. The finest specimens come from India. The ancients esteemed onyx highly as a gem, particularly for cameos. Its advantage as a cameo stone is its property of stratification, which makes possible the working out of a subject in relief upon a background of a different color. Apart from its use as a gem stone, it is made into beads, and such larger objects as cups and bowls, table tops and vases, pillars and other details of architectural structure. The stairway of the Paris Opera is made entirely of onyx. Mexican onyx is softer than real onyx; Gibraltar stone is only an onyx marble; and Algerian onyx is a variety of calcite artificially colored.

**Onyx Marble,** an ornamental stone, composed chiefly of carbonate of lime and used for interior architectural finishings, and small articles, such as table tops, paper weights, bases for statuary and vases. It includes two rock types: one in which the formation is caused by hot-spring deposit; the other in which the deposition has been made by cold water upon the roof, floor or walls of limestone caves. In some varieties deposits of successive layers give a beautiful banding effect, while on others colored cloudings and veinings appear, due to the presence of metallic oxides. These marbles are widely distributed, but large accumulations are rare. They are found in Arizona, California and Colorado, but the chief supply of the United States comes from Mexico.

**Oolite,** *O' o lite,* a compact variety of limestone composed of small round grains that resemble the spawn of fish. The name is from the Greek word meaning egg. The grains vary in size from a pinhead to a pea. When they are very large the rock is known as pisolite or pea stone. See LIMESTONE.

**O'pal,** a precious stone, composed chiefly of silica. It contains from 2 to 13 per cent of water and is very brittle. In color it is usually pale yellow, red, blue and green, though sometimes found in dark shades, coloration depending upon the different dioxides. The opal is never found in crystals and is sometimes nearly transparent. The gem shows to best advantage when the upper surface is cut in convex form. The precious opal, sometimes called the Oriental opal, is bluish or yellowish in tint and semi-transparent, and contains minute fissures filled with air and moisture, which cause a brilliant play of prismatic colors. The fire opal is also a beautiful and valuable variety. Opals are found in Queensland and New South Wales, Australia; and in Idaho and Washington in the United States. The finest stones come from Dunkirk, Hungary.

**Open-Door Policy,** a term of diplomatic significance in international politics which came into general use in 1899,

and which indicates an arrangement binding by general consent, rather than by treaty, whereby all nations are allowed to trade in China and its dependencies upon equal terms. This agreement so far as the United States and other powers are concerned places China commercially in the same relation she occupied before the spheres of influence were recognized. Her tariff rates are to be uniform for all nations with which she has trade treaties. This result was brought about by Secretary of State John Hay in 1899, when he made a request of the great powers that they make a pledge of noninterference with any vested commercial interests wherever their influence extended. Russia was the only European nation refusing to accede to the request. The open-door policy is one principle of the Anglo-Japanese Treaty, and it tends to prevail among European nations. Great Britain, Germany, France, Norway, Sweden and Russia have now all agreed to abide by this policy in their trade with weaker powers.

**Open-Hearth,** *Harth,* **Furnace,** a furnace of the flame type for working iron into steel. This furnace is similar in principle to that of the reverberatory furnace (See REVERBERATORY FURNACE), wherein the flame is brought in contact with the metal on a hearth, and a roof over it projects the heat downward towards the metal. In addition to the hearth and connected with it by various flues are chambers composed of checker-brick work for the purpose of heating the air and gases required for combustion. The construction varies in minor details for different capacities, etc., but a well-known and typical open-hearth furnace consists of regenerative chambers of checkerwork construction, which are separate from each other. Underneath is the hearth shaped like a huge saucer. Either chamber may be connected with the smokestack or with the hearth.

In operating the furnace, one chamber is heated until the checker-brick work gets white hot, and through this a mixture of air and gas is admitted at the bottom, so that when this mixture reaches the hearth, it becomes quite hot and burns fiercely over the hearth and a portion of the heat is given to the charge of metal. The hot gases are afterwards brought downward through the brickwork of the second chamber, and serve to heat it before escaping into the smokestack. The hearth is sometimes made so that it can be tilted to receive its charge and deliver the contents of molten metal. For this purpose various mechanical aids, operated by hydraulic and pneumatic power, are employed. The open-hearth furnace is lined either with sand and siliceous slag, or dolomite, depending upon the process used in making steel.

**Op'era,** a drama set to music, or in which music constitutes the chief part. The parts are sung or recited to music, and an overture usually precedes the opening scene. Operas are designed for orchestral music, and large orchestras are usually employed for the accompaniment. The parts consist of solos, duets, quartets and choruses, which are usually enlivened by dancing. Opera is classified as grand opera, which deals with serious themes, has an elaborate musical composition and is presented with elaborate and striking scenery; and comic opera, or opera bouffe, which is characterized by a light theme and light popular music. Some operas occupy a position between these two, containing a combination of the serious and the humorous.

Opera is supposed to be the outgrowth of the early Greek plays, but modern opera originated in Italy early in the 16th century, and it now offers opportunity for almost every form of musical effect. The following are among the most celebrated operas: *The Barber of Seville,* Rossini; *Faust,* Gounod; *The Magic Flute,* Mozart; *Don Giovanni,* Mozart; *Aïda,* Verdi; *La Traviata,* Verdi; and the following operas by Richard Wagner: *Tannhäuser, Tristan and Isolde, Parsifal, Lohengrin* and *Hansel and Gretel.* Among light operas the following are widely known: *Martha,* Flotow; *The Mikado,* Sullivan; *Pinafore,* Gilbert

and Sullivan; and *Robin Hood,* De Koven.

**Opera Glass,** a small, handy, portable, double telescope, having double-concave lenses for eyepieces and double-convex lenses of larger diameters for object glasses. The eyepieces are fitted over tubes which slide in and out by turning a screw, so that the focus is easily obtained. It is used to magnify objects at a distance, especially in operas and theaters; hence its name. See FIELD GLASS; LENS; TELESCOPE.

**Ophthalmoscope,** *Of thal' mo skope,* an instrument employed for examining the interior of the eye and detecting diseases in it. It consists of a concave, circular mirror, with a hole in its center, and having a handle mounted on a stand supplied with a set of lenses that can be adjusted. The instrument is placed in a dark room in front of the patient, who is seated with a light behind him, so adjusted that it is reflected by the mirror into the eye. The oculist views the interior of the eye through the lenses, which so magnify the membrane that it can be readily examined.

**O'pium,** the dried juice procured from the fruiting pods of all poppies, but chiefly from those of the opium poppy, and extensively used as a narcotic. The plant is a native of eastern Asia, but is grown in Europe and America partly for the drug but often merely as an ornament. To obtain opium, cuts are made in the pod, and the milky juice is allowed to exude. It is left 24 hours upon the plant, and there, in contact with the air, it becomes a waxy, brown substance easily molded into small cakes for the market. Opium contains 19 alkaloids, chief of which is morphine; one of its common forms is an alcoholic solution known as laudanum.

Medicinally, opium in small doses is a stimulant; in large ones, a narcotic. It is probably chiefly employed as a sedative by persons who have formed the habit of smoking it, taking hypodermic injections or using it in tablet form. Its first effect is to render the one who takes it free from pain and anxiety and to give to him the pleasurable sensations of happiness and comfort. As this effect begins to wear off a period of depression follows, which seems to require a second dose of the drug. Thus a drug habit is formed which is disastrous in its effects and extremely hard to break. In its later stages, the opium habit causes loss of memory, and a lack of the moral sense which enables one to distinguish between right and wrong. The Chinese and people of other eastern Asiatic countries are probably the greatest opium smokers.

Poisoning from overdoses of opium frequently occur and should be treated by use of emetics. Opium in any form should never be used except under the direction of a competent physician, and the use should be discontinued at the earliest possible moment.

**Oporto,** *O pore' too,* a city and seaport of Portugal, situated on the Douro River about 3 m. from its mouth and 172 m. n.e. of Lisbon. The location of the city, nestling on the hillsides between two rocky headlands, is picturesque, and in the upper and modern part of the town the wide avenues command a fine view of the river below and the ocean beyond. The prominent buildings are the "Tower of the Clergy," the Crystal Palace, the Gothic Cathedral, several schools and churches and the English factory house. The manufacturing establishments are important and include sugar refineries, tanneries, distilleries and manufactories of beverages, pottery, fabrics and jewelry. Port wine, to which the town gives the name, constitutes the principal article of trade. As the chief industrial city of Portugal, the harbor facilities have recently been extensively improved. Population in 1900, 167,955.

**Opos'sum,** an interesting member of the Opossum Family of Marsupials. There are over 20 species, one of which John Smith described in his early history of Virginia. The opossum is about the size of a cat, has big eyes, a pointed, white face and a long hairless tail which it uses much like a fifth paw. By means of it, the opossum will hang, sleeping, from its favorite yum tree or carry bun-

dles of dried leaves and grasses for its winter nest in a tree hole. It is a familiar sight to see the young upon the mother's back grasping her tail tightly with their own. The opossum has a ruffled coat which always looks unkempt because a part of it is long and white, and another underneath is short and brown. Like all Marsupials the opossum has a pouch for carrying the young, which are born in a helpless condition.

One of the most peculiar and unexplainable characteristics of the opossum is its habit, upon being pursued, of "playing dead." It suddenly drops to the ground, draws back its gums from its teeth, as though dead for a long time, and lies apparently without heartbeat or breath. If, however, the pursuer turns to look for a club, the "dead 'possum" is up and away, or if his hand comes too near the white teeth they act suddenly and viciously. The flesh of the opossum is tender and greatly prized in the South. The phalanger in Africa is often wrongly spoken of as the opossum. It is a member of an allied family of Marsupials, but does not particularly resemble the opossum.

**Op'per, Frederick Burr** (1857- ), an American illustrator, born in Madison, Ohio. For three years he was on the art staff of Frank Leslie's magazines and for 18 years he was connected with *Puck,* which he left in 1899 for Hearst's New York *Journal.* He has illustrated for Bill Nye, Mark Twain, Hobart and Peter Dunne, and has written *The Folks in Funnyville* (with his own verses and pictures), *Our Antediluvian Ancestors, Happy Hooligan, Alphonse and Gaston, John Bull, Happy Hooligan Home Again* and *Maud the Matchless.*

**Op'tic, Oliver.** See ADAMS, WILLIAM TAYLOR.

**Op'tics,** the science of light. See LIGHT.

**Optimism** (from Latin *optimus,* best), a term opposed to pessimism and applied to the disposition to look on the bright side of things and to hope for the best. In metaphysics, it is the doctrine, receiving classic expression in the system of Leibnitz, that the world is the best one possible, and that everything in nature is so ordered as to produce the greatest good. In Christianity, it is the belief that God is in the world working out his beneficent purposes, that pain and suffering are but incidental to a higher good, and that the consummation of the historical process will result in the highest development of the aspiring individual and the human race.

**Oracles.** See GREECE, subhead *Oracles.*

**Orange,** *Or' enj,* a well-known and popular fruit grown upon a small evergreen, subtropical tree of the Rue Family. The tree is not unfamiliar in the North, through its cultivation in greenhouses and conservatories, but there it rarely grows to be more than a shrub, and its fruit is small and generally unpalatable. The leaves of the orange are long, shiny and of a bright green color. The blossoms are waxy white and very fragrant and have come to be the significant flower for the bridal wreath. The tree itself rarely grows to a height of more than 30 ft., and in most groves is pruned back to improve the quality of the fruit.

The orange tree is native in Asia, but has long been cultivated in southern Europe and parts of the United States. It is a long-lived tree and under favorable circumstances is remarkably productive. The fruit consists of a sweet, juicy pulp of from ten to twelve sections, surrounded by an orange-yellow rind containing a bitter aromatic oil. Most oranges have seeds, but the variety considered most desirable is seedless; it is called the navel orange and has a peculiar growth at the apex.

Oranges are especially fitted for shipping as they keep well; they are at their best at a time when other fruit is more scarce, and the juice is always considered healthful and appetizing. The common orange is the sweet, or Chinese, orange. The blood orange is a variety of this, having a red pulp and a rough red rind. The mandarin orange, also a Chinese variety, is small and somewhat flattened but

has a pleasant flavor. The Seville, or bitter, orange is an Arabian species used chiefly for making marmalade. Russets are a dark-skinned variety raised commonly in Florida.

Probably oranges are among the foremost of fruits upon the market. In the United States, California and Florida lead in their production. The orange trees in the United States number more than 8,000,000 and the annual yield averages more than 10,000,000 boxes. The orange blossom is the state flower of Florida.

**Orange, N. J.,** a city of Essex Co., 4 m. n.w. of Newark and 12 m. w. of New York City, adjoining East Orange and South Orange and on the Orange Branch of the Erie Railroad and the Morris & Essex Division of the Delaware, Lackawanna & Western Railroad. The city is attractively situated at the base of Orange Mountain and contains numerous elegant residences and estates of New York City and Newark business men. With East Orange, South Orange and West Orange, it constitutes practically a single community known as "the Oranges." The city has many miles of broad and well-shaded streets and long lines of hedges. Adjoining the city are Hemlock Falls in South Orange, and Llewellyn Park of 750 acres is in West Orange. Electric lines connect with Newark, Jersey City, Montclair, Bloomfield, South Orange and other neighboring cities.

Public Buildings. The noteworthy buildings include Orange Memorial Hospital, with Shepard pavilion and a training school for nurses, an orphanage, House of the Good Shepherd, Stickler Memorial Library, Columbus School Building, Music Hall and Masonic Temple. The First Presbyterian Church, originally built in 1719, and several times remodeled, is of historic interest. The city has a good school system and several private schools, including the Dearborn-Morgan School for girls, the Carteret Academy for boys, Locke College for boys, Seton Hall College (Catholic) for men and boys, and a public library.

Industries. Orange is widely known as the center of an important felt-hat manufacturing industry. Other manufactured products include lawn mowers, pharmaceutical supplies, phonographs and malted liquors. Adjoining Llewellyn Park is the famous Edison laboratory.

History. Orange was settled about 1666 by a colony from Connecticut. At first it was called Newark Mountain and belonged to Newark. The residents of Newark Mountain established a separate church and the organization was known as the Mountain Society. This church is now known as the First Presbyterian Church of Orange. In 1790 the place was called Orange Dale. The township was incorporated under the name of Orange in 1806. Parts of its territory were included in South Orange and West Orange in 1861 and 1862. East Orange was separated in 1863. Orange was incorporated as a town in 1860 and granted a city charter in 1872. Population in 1910, 29,630.

**Orangemen,** *Or' enj men,* a secret society of Protestants founded in Ireland in 1795. Its objects are: support of the Protestant religion, defense of the ruling King or Queen of Great Britain, the union of Great Britain and Ireland and support of the reigning family so long as it remains Protestant. It received its name from William III of England, Prince of Orange, and July 12, the anniversary of the Battle of the Boyne, is Orange Day.

**Orange River,** the principal river of South Africa. It rises on the slopes of a peak of the Drakensberg Range, flows west and southwest, forms the northern boundary of Cape Colony, and, after a course of about 1300 m., empties into the Atlantic Ocean. Its chief tributary is the Vaal. The famous "Hundred Falls," or the Great Anghrabies, are found above its confluence with the Molopo Wadi. This and other rapids, as well as sand bars, check navigation.

**Orange River Colony,** now Orange Free State, a province of the South African Union of British Africa. See South Africa, Union of.

**Orang-Utan,** *O rang'-Oo tan",* a man-like, or anthropoid, ape of the Simian Family. In intelligence it ranks probably among the lowest of the apes. The orang-utan is a tree dweller and builds temporary night quarters for its family high above the ground. Its arms are very long and are used much like crutches, as with bent knuckles the orang-utan swings itself along the ground. In the trees, it proceeds by a hand-over-hand method, a means by which it is able to travel rapidly. The head of the orang-utan has a rounding skull and a heavy, protruding jaw. The face has dark callous spots and is surrounded by long, shaggy hair, which in the old males lengthens to a long beard beneath the chin. The entire coat is reddish-brown in color. The orang-utan is not vicious unless attacked, but then defends itself bravely. In captivity it is practically untamable, possibly because of its great shyness and fear of humankind. See APE.

**Or'bit,** the path of a heavenly body in its revolution about another body, as the path of the earth around the sun. The ancients believed all orbits were circles; but nearly all are elongated circles or ellipses. In the case of comets the ellipses are usually greatly elongated, making the period of revolution scores and sometimes hundreds of years. Sometimes the ellipse is infinitely elongated, becoming a parabola, in which case the comet never returns. The orbits of the satellites are more or less inclined to the orbits of their primaries. See ASTRONOMY; ECLIPTIC; PLANET; SOLAR SYSTEM.

**Orcagna,** *Or kahn' yah,* **Andrea** (about 1308-about 1368), one of the foremost Italian painters of the 14th century. The son of a goldsmith, he learned his father's craft and was also a sculptor and architect of renown. In his sculpturesque and graceful figures he combined tenderness, spirituality and vigor, and made considerable advance in perspective and in the treatment of light and shade. His sculptural masterpiece is the marble tabernacle in the Church of Or San Michele, Florence, the most beautiful piece of Gothic sculpture in Italy. Other notable works are *Paradise,* a mural painting in the Strozzi Chapel at Santa Maria Novella; the mosaics of the façade of the Cathedral of Orvieto; and a painted altar panel in the Strozzi Palace, Florence.

**Orchid,** *Or' kid,* **Family** (Orchidaceæ), a large family of highly interesting plants, whose flowers are noted for their size, colors and curious shapes. There are over 6000 species known, about one-half of which are so-called air plants.

The plants are all herbs and as a family are not difficult to recognize. The stems grow from bulbs or tuberous roots and have scaly, parallel-veined leaves which always clasp the stems at the bases and are covered with soft hairs. The flowers are irregular and have a little sheathing scale called a bract at the base of the flower stem. The sepals and petals together form two whorls which are hard to distinguish on account of their colors. Two of the sepals are alike in form and color, but the third forms a hood or sheath over the petals. The same relation is found in the petals, where two are alike but the third is an irregular, enlarged lip; this lip may be fringed, pouched, bristled or toothed, and is generally the most beautifully marked. Often, too, this lip has a spur filled with nectar, which is of especial interest for it is always of exactly the same length as the tongue of the moth which is to aid in the fertilization of the flower.

There are two classes of orchids known from their habitats: the epiphytes or so-called air plants, which were once supposed to live upon air, and the terrestrial orchids. The epiphytes grow chiefly in the tropics. Their seed lodges in the angle of a tree and sends out a so-called root which flattens on the branches and forms a series of suction cells that hold tightly to the bark. Other roots, which have the function of providing food for the plant, hang like thread or grow in any direction from the tree in curiously contorted shapes.

Terrestrial orchids are more common in the temperate zones. Many species grow wild in the United States, and of these some of the most interesting are neglected because of the smallness of the flowers. Our most common wild species are the coralroot, twayblade, ladies' tresses, arethusa, grass pink, orchis and Lady's Slipper. Wild orchids are found generally in cool, damp woods, preferably pine or cedar, and bloom from May until August. See CROSS-FERTILIZATION; LADY'S SLIPPER.

**Ord, Edward Otho Cresap** (1818-1883), an American soldier, born in Cumberland, Md., and educated at West Point. He served as second lieutenant in the Seminole War, did coast survey duty, performed garrison service during the Mexican War, took part in expeditions against the Indians and aided in capturing John Brown at Harper's Ferry. In September, 1861, he became brigadier-general of volunteers, soon became major-general and commanded at Corinth, Jackson and Vicksburg. At Ft. Harrison, in the campaign against Richmond of 1864, he was severely wounded, but he later commanded the Department of Virginia from January to June, 1865, and participated in Lee's capture. He was brevetted major-general in 1865, was retired in 1880 and by special act of Congress was commissioned major-general the following year.

**Ordeal,** *Or' deel,* **Trial by,** a form of trial in ancient times to determine guilt or innocence. There were two principal kinds—fire ordeal and water ordeal; the former was confined to persons of high rank, the latter to the common people. In the ordeal of boiling water the accused was obliged to insert his hand into a caldron and take out a small object. After three days the hand was unbound and innocence or guilt proved by its condition. Fire ordeal was performed by taking in the hand a piece of red-hot iron, or by walking barefoot and blindfolded over glowing coals or over nine red-hot plowshares laid lengthwise at unequal distances. If the person escaped unhurt he was adjudged innocent, otherwise he was condemned as guilty. The various ordeals are still practiced among the Hindus and some African tribes.

**Order.** See BOTANY, subhead *Classification.*

**Orders in Council.** See MILAN DECREE.

**Or'dinance of 1787,** an act of Congress passed in July, 1787, to regulate the government of the territory northwest of the Ohio River (See NORTHWEST TERRITORY). The ordinance, which has been called "the most notable law ever enacted by the representatives of the American people," furnished the basis for the constitutions of several states. It is especially noted for three great features of good government—its guaranty of freedom of worship, its perpetual prohibition of human slavery, and the prominence given to the subject of schools and education. In the ordinance was a provision that no more than five states, and not less than three, were ultimately to be organized within this territory. No section was to be cut off and organized into a state until there were 60,000 people within its proposed boundaries. The Ordinance of 1787, the Declaration of Independence and the Federal Constitution have been called "the three title deeds of American constitutional liberty."

**Or'egon,** THE BEAVER STATE, one of the Pacific States, is bounded on the n. by Washington, on the e. by Idaho, on the s. by Nevada and California and on the w. by the Pacific Ocean. The Snake River forms about one-half of the eastern and the Columbia River most of the northern boundary.

SIZE. The length from east to west is 395 m., the breadth is 278 m. and the area is 96,699 sq. m., of which 1092 sq. m. are water. Oregon is over twice the size of Pennsylvania, about equal to Pennsylvania, New York and Rhode Island combined, a little smaller than Wyoming and the ninth state in area.

POPULATION. In 1910 the population was 672,765. From 1900 to 1910 there was a gain in population of 259,229, or 62.7 per cent. There are 7 inhabitants

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to the square mile and the state's rank in population is 35.

Surface. The Cascade Mountains cross the state from north to south about 100 m. from the coast, and constitute its most prominent physical feature. These mountains are a continuation of the Sierra Nevadas of California and they have an average elevation of about 7000 ft., but contain a number of peaks over 10,000 ft. high. The most celebrated of these is Mt. Hood, 11,500 ft., near the northern border. Other peaks of prominence are Mt. McLoughlin, 11,000 ft., and Mt. Jefferson, 10,500 ft. Just east of these mountains is the Valley of the Deschutes River, with its unparalleled power resources.

The Cascades divide the state into two unequal parts, Eastern Oregon and Western Oregon. Eastern Oregon comprises about two-thirds of the state. In general it is a plateau region with a rolling and uneven surface in the south, and a more mountainous surface in the north. A height of land extends across this plateau from east to west, striking the eastern boundary of the state about midway between the northern and southern borders. The Blue Mountains, an irregular range with an altitude of about 7000 ft., extend across the northern part of the state; and south of them are the Cedar Mountains. In the extreme northeastern corner are the Powder River Mountains, which suggest comparison with the Alps of Switzerland. In this section the rivers have worn deep channels and canyonlike gorges wherever they have crossed the mountain range.

Western Oregon is crossed by the Coast Range, which is from 10 to 30 m. inland. This is a range of low mountains nowhere exceeding 4000 ft. in altitude. Between the Coast and the Cascade ranges there is a great fertile valley, the northern part of which is watered by the Willamette. In the southwestern section are the valleys of the Rogue and the Umpqua. The Cascade and Coast ranges are heavily timbered.

Rivers and Lakes. A considerable region in the southwestern part of the state is drained by the Rogue, the Umpqua and the Klamath directly into the Pacific. With this exception the entire state is drained into the Columbia. Its great tributary, the Snake, drains the eastern part, and, proceeding westward, the other tributaries are the John Day, the Deschutes and the Willamette. The Columbia is the most important stream connected with the state (See Columbia River).

There are a number of lakes in the southern part of the state, but the region which they occupy has not been easily accessible owing to lack of railroad facilities, and they are but little known.

Scenery. The valleys between the mountain ranges are beautiful and the high peaks of the Cascades lend an element of grandeur to the scene. Mt. Hood near the northern border rises with its white crown like a giant sentinel to guard the Valley of the Willamette. The cascades and rock formations on the Columbia River are remarkable for their beauty, and the Columbia is considered to have the grandest scenery of its kind in America. The canyon of the Snake River is considered by some to rival the Grand Canyon of the Colorado. Many other streams form canyons and gorges of greater or less interest. Crater Lake in the southwestern part of the state is one of the world's natural wonders. The lake is set in the crater of an extinct volcano, more than five miles in diameter, and the surface of the water is over 1000 ft. below the rim of the crater. This beautiful lake has been enclosed in a national park.

Climate. Oregon has an east to west rather than a north and south climate. Western Oregon has an equable climate with a mean summer temperature of 64°. There are a few hot days but the periods of extreme heat are of short duration and the nights are always cool. The winters are mild and characterized by long spells of rainy weather. The mean temperature for the winter is 40°. In this part of the state the rainfall is heavy, being more than 44 inches. Snow is so rare in the valleys as to inspire a

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sense of wonder among the young people. The snow remains only a few days except in the mountains. In February and March there are many days of delightful crisp, sunny weather. The climate of Eastern Oregon is subject to greater extremes of heat and cold. The winds from the Pacific lose their moisture in crossing the mountains, and the rainfall is light, varying from 22 inches to 9 inches. The average summer temperature is 75°. The mean winter temperature is 38.5°. The average snowfall is 38 inches. In general the atmosphere of this part of the state is dry and clear and the region has many bright, sunny days.

Minerals and Mining. There are valuable gold mines in the Blue Mountains, and their annual output of gold amounts to about $4,200,546. There are also important silver mines in this locality. Copper, iron and nickel are found in the southwestern counties. Bituminous and lignite coal occur in numerous places, and building stone and clay suitable for brick are found in nearly all parts of the state.

Forests and Lumber. It is estimated that one-fifth of the standing timber of the United States is in Oregon. Oregon has the largest forests of any state in the Union. On the Coast Range and on the western slope of the Cascade Mountains are dense forests of yellow and sugar pine, yellow and white fir, red and white cedar, spruce, juniper and tamarack. The forests are remarkable for their size. Cottonwood, birch, oak, maple and other hard woods occur in the valleys. Lumbering is one of the most important industries in the state; the annual output of lumber amounts to about $30,000,000. The chief centers are Portland, Astoria, Eugene, Springfield and Coos Bay region.

Agriculture. The equable climate, abundance of rain and the fertile soil make ideal conditions for agriculture in Western Oregon, and conditions are equally good in Eastern Oregon where water can be obtained. The great valley between the Cascade and Coast ranges is the most densely populated portion of the state, and all land available for cultivation is here practically under tillage. In Western Oregon the farms seldom exceed 80 acres, and intensive farming is practiced, but in Eastern Oregon the farms are larger.

*Soil.* In Western Oregon the soil is a clayey loam, black and gray in color. A red "shot" clay is also common in the foothills. Along the streams a sandy loam is found. In Eastern Oregon the soil is formed by decomposition of volcanic rock. In all parts of the state the soil is fertile and produces abundant crops when sufficient water is available.

*Products.* There is a great variety of products. In Western Oregon alfalfa, clover, timothy and vetch are grown for hay and forage. Wheat, oats, hops and all kinds of vegetables are also grown in large quantities. The western and southern regions and sections along the Columbia River are especially suitable for raising fruit, and in these sections large quantities of apples, peaches, pears, plums, cherries and small fruits of all sorts are raised. Both the soil and climate are especially suited to fruit growing; in these localities the product is of excellent quality. In Eastern Oregon wheat and other cereals are raised in large quantities, while the center of the state is well suited to grazing.

Live stock is an important factor, large numbers of cattle, horses and sheep being found within the state. In some localities Angora goats can be raised with profit and these animals are being introduced. In Western Oregon dairying is an important branch of agriculture and this is one that is constantly growing. Poultry raising is also profitable. The demand of the home markets for dairy products, poultry and eggs is much greater than they can supply.

Fisheries. The Columbia River has long been famous for its salmon, and these fish are taken in large quantities in the lower part of the stream. The salmon fisheries and allied industries give employment to about 8000 men; the yearly income from this source is about

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$6,000,000. Hundreds of tons of these fish are shipped to Eastern markets and European countries each year. Salt-water fish including halibut and sturgeon are taken off the coast. Oyster fisheries are of some importance.

MANUFACTURES. The production of lumber and lumber products is the leading manufacturing industry. Next to this are the canning of salmon and all industries allied with the salmon fisheries. Flour and grist mills are widely distributed through the state. At Oregon City are some of the largest pulp and paper mills in the country. Machine shops and foundries are located wherever there is sufficient demand for their products. In the fruit-growing sections there are numerous canning establishments. Portland is the chief manufacturing center and has a variety of manufacturing industries. The available water power of the state is practically unlimited.

TRANSPORTATION AND COMMERCE. The Columbia River is navigable for ocean-going vessels as far as Portland and for smaller vessels as far as the Dalles. Long stretches above this point are used as waterways. The stupendous government improvements at Celilo will soon be completed, giving an open river of great commercial value to the border of Idaho. The estuary at the mouth of this stream forms a large landlocked harbor. Smaller harbors are found at Coos Bay, Florence, Newport and Tillamook. The northern and western parts of the state are well supplied with railways. The Spokane, Portland & Seattle, jointly owned by the Great Northern and the Northern Pacific, follows the north bank of the Columbia River to Portland; and a line of the Washington & Oregon Railway and Navigation Company system enters the state at about the middle point of its eastern boundary and extends in a northwest direction until it reaches the Columbia River, which it follows to Portland. Each of these lines has a number of branch lines extending into Eastern Oregon, and the Hill System has a line under construction which, when completed, will extend across the state by way of the Valley of the Deschutes. The Southern Pacific has lines extending north and south through Western Oregon. One of these is a trunk line which connects Portland with San Francisco. Another is being rapidly extended across the state from the eastern border. Both the Hill and the Harriman systems have electric lines of some 200 m. of tracks.

The commerce is extensive. Large quantities of lumber and lumber products are shipped to all parts of the country. Portland is the greatest wheat-shipping port on the Pacific coast. Fruit, canned goods, live stock and wool constitute the chief agricultural products sent to Eastern markets. Manufactured goods, machinery and foodstuffs are imported. Portland is the chief railway and commercial center.

GOVERNMENT. The Constitution was adopted in 1859 and has received a number of important amendments. Woman suffrage was adopted in 1912. The executive department consists of a governor, secretary of state, treasurer, state printer and superintendent of public instruction, each elected for four years. The Legislature consists of a Senate, the membership of which cannot exceed 30, and a House of Representatives whose membership is limited to 60. Senators are elected for four years and representatives for two years. Sessions are biennial.

The judicial department consists of a Supreme Court of five judges elected for six years; Circuit Courts in the various judicial circuits into which the state is divided, each of which is presided over by a circuit judge elected in his own district; and County Courts presided over by county judges, who also have probate jurisdiction.

EDUCATION. The state has a large school fund which is constantly increasing from the sale of school lands. An excellent system of public schools is maintained. The state superintendent of public instruction has the general direction of the school system and the schools of each county are under the

supervision of a county superintendent. The state university at Eugene is at the head of the educational system. The state agricultural college is at Corvallis and the state normal school is at Monmouth. The leading educational institutions not under control of the state are Willamette University at Salem; Pacific University at Forest Grove; Mt. Angel Academy at Mt. Angel; Albany College at Albany; McMinnville College at McMinnville; Pacific College at Newberg; Dallas College at Dallas; and St. Helen's Hall, Columbia University and the Reed Institute at Portland.

State Institutions. The charitable and penal institutions of the state consist of a hospital for the insane, schools for the deaf and blind, a state penitentiary, a boys' reform school and a state tuberculosis sanatorium, all located at Salem.

Cities. The chief cities are Salem, the capital; Portland, Astoria and Eugene.

History. Oregon, possibly the Algonquin "beautiful water" as first applied to the Columbia River, was visited along the coast by Drake in 1579, at Nootka Sound by Captain Cook in 1778, and again along the coast and up the Columbia River by Robert Gray and by Vancouver in 1792. Originally, Spain claimed the region by virtue of explorations dating back to 1543. The United States did likewise because Robert Gray, 1792, in the ship *Columbia,* discovered the Columbia River, which Lewis and Clark, 1805, explored. Russia, France and Great Britain also claimed the territory. In 1811 John Jacob Astor established Astoria, which the British captured in 1813. It was returned to the United States by the Treaty of Ghent in 1814. By the Convention of 1818, extended in 1827, it was held under a system of joint occupancy and control. In 1834 Jason Lee and a few associates founded a mission in the Willamette Valley. In 1836, Whitman, Spalding and their young wives, who were the first white women to cross the Rockies, established a mission in the Columbia Valley. Later, when the United States declared "Fifty-four forty or fight," and Great Britain wanted the land down to the Columbia River, a treaty, 1846, settled the boundary at 49°. Regular settlements by home builders began in Oregon in 1842. The pioneers made the four to six months' march across the plains. This Oregon Trail was used by the annual cavalcades for many years. Oregon was organized a territory, 1848, though not without much opposition, because of its remoteness. In 1859 it entered the Union. Oregon's bounds then had their present position. Indian outbreaks and isolation alone have interrupted the state's steady prosperity. Laws of 1905, later amended, provide for the popular nomination of senators and do away with party conventions. Consult Lyman's *History of Oregon* or Schafer's *Pacific Slope and Alaska.*

Governors. John Whiteaker, 1859-1862; Addison Crandall Gibbs, 1862-1866; George Lemuel Woods, 1866-1870; La Fayette Grover, 1870-1877; Stephen Fowler Chadwick, 1877-1878; William Wallace Thayer, 1878-1882; Zenas Ferry Moody, 1882-1887; Sylvester Pennoyer, 1887-1895; William Paine Lord, 1895-1899; Theodore Thurston Geer, 1899-1903; George Earle Chamberlain, 1903-1909; Frank W. Benson, 1909-1911; Oswald West, 1911-1915; James Withycombe, 1915—. No governor can serve more than two terms in succession.

**Oregon, The,** a famous battleship of the American navy, built at San Francisco in 1891. With a tonnage of 10,524, it can reach a speed of 17 knots an hour, and carries four 13-inch guns, eight 8-inch, four 6-inch and 31 rapid-fire machine guns. It cost about $3,250,000. At the opening of the Spanish-American War, the *Oregon* was ordered from San Francisco to Key West, and between March 19 and May 24 covered 16,000 m. with no mishap. While in Rio de Janeiro, Captain Clark received word that the Spanish torpedo boat *Temerario* had left Montevideo to destroy the *Oregon.* However, no attack was made. In the Battle of Santiago, July 3, the speed

of the *Oregon* made it conspicuous. It forced the *Cristobal Colon* ashore to escape destruction from its 13-inch shells, and doubtless prevented the escape of the *Colon* and the *Vizcaya.* Following the war the *Oregon* went to Manila.

**Oregon, University of,** at Eugene (1872). The university maintains a graduate school and has, at Portland, schools of law and medicine. Its departments for undergraduates include the college of literature, science and the arts, the college of science and engineering and a school of music. Its library contains over 30,000 volumes. The enrollment in all departments is about 1500.

**O'Reilly,** *O' Ri' ly,* **Charles** (1846- ), a Canadian physician, born in Ontario and educated at McGill University. He was resident physician at the Hamilton City Hospital from 1867 to 1875 and medical superintendent at the Toronto General Hospital from 1875 to 1905. Moreover he was examiner in clinical medicine for Toronto and Trinity universities for long periods. Dr. O'Reilly, who is a hospital expert, is responsible for the first Canadian ambulance.

**O'Reilly, John Boyle** (1844-1890), an eminent Irish-American poet and journalist, born at Dowth Castle, Ireland. After working in a printing office he became a newspaper reporter and went to London at the age of 18 as an agent for the Fenian Society. In 1865 he enlisted in a British regiment and was soon tried for high treason because he attempted to induce the Irish soldiers to revolt. His sentence to penal servitude for 20 years because of this offense came to an end in 1869 when he made his escape from the Australian colony and went to America. He was editor of the *Pilot* from 1870 until his death, founded the Papyrus Club of Boston, and remained loyal to the Fenians throughout his life, taking part in the Fenian Raid into Canada. He wrote *Songs from the Southern Seas and Other Poems, Statues in the Block and Other Poems, America* and *Moondyne: A Story from the Under World.*

**O'Rell', Max.** See BLOUET, *Bloo" el'*, PAUL.

**Orestes,** *O res' teez,* according to Greek legend a son of Agamemnon, King of Mycenæ, and of Clytemnestra. His mother became enamored of Ægisthus and conspired with him to kill Agamemnon. They then took possession of the kingdom. Orestes' life was saved by Electra, his sister, who sent him to his uncle, who was King of Phocis. Here Orestes grew to manhood with the King's son, Pylades, with whom he formed a life-long friendship. Orestes was frequently reminded by Electra of his duty to avenge his father's death. When grown to manhood he consulted the oracle at Delphi, which encouraged him in his purpose. He then visited his father's tomb, made himself known to Electra and went to Argos, where, by pretending to be a messenger from the King of Phocis, he was admitted to the presence of Ægisthus and Clytemnestra, both of whom he killed.

The people were horrified by his act and Orestes was driven by avenging deities from land to land. Finally he made a second appeal to the oracle and was informed that he would be forgiven if he would bring a statue of Diana from Tauris to Greece. He found that his sister, Iphigenia, was priestess in the Temple of Diana at Tauris, and they returned home in safety. See AGAMEMNON; IPHIGENIA.

**Or'gan,** a wind musical instrument. Organs are of two general classes, pipe organs and reed organs. The pipe organ is the type generally found in large churches and convention halls, and is the largest and most magnificent musical instrument known. The principal parts are the bellows, the wind chest, the sound board, the pipes and the keyboards for both hands and feet. The wind chest contains compressed air, which is forced into it by the bellows, the latter being operated by hand power or by a motor moved by water or electricity. The sound board is attached to the upper part of the wind chest, and is divided into as many grooves as there are keys, so that

it can convey the air to any key desired. The air is admitted to the pipes by operating the keys, each key opening a valve into the pipe with which it is connected. The tone is regulated by a slide called the register. The pipes are of two kinds, known as the flute and the reed pipes. The sound is produced in the reed pipes by the vibration of a metallic tongue or reed; in the flute pipes, by a current of air across the mouth. The pipes are of metal and of wood. The metal pipes are cylindrical, and those of wood are shaped like a long, narrow box. The pitch is determined by the length of the pipe, and the quality of tone by the material of which it is constructed and its diameter. Small, short pipes produce the high notes, long, large pipes, the low notes. The pipes are arranged in groups, called stops, and the air is admitted to all the pipes connected with one stop by opening the slide, or register, leading into the part of the sound board which communicates with this set of pipes, each individual pipe being sounded by pressing its key.

In every large organ the pipes are arranged so as to constitute a number of different organs or partial organs. The average church organ contains the great organ, the swell organ and the choir organ. To this the solo organ is sometimes added. The echo organ consists of a small organ usually placed at some distance from the large one. The average church organ contains two rows of manuals, or keys, and one set of pedals which play the pipes producing the low tones, or bass notes. The stops are a series of pipes placed above each slide. The chief stops are the *open, stopped* and *double diapasons; the principal, dulciana, melodia, salicional, flute, trumpet, clarion, bassoon, oboe* and *vox humana.*

In some form the pipe organ has been known from early times, being in use by the ancient Greeks and Romans. Among the largest organs are those in the following edifices: Notre Dame of Paris; St. Peter's, Rome; Seville Cathedral, Haarlem; the Auditorium, Chicago; the Tabernacle, Salt Lake City; and Convention Hall, Kansas City, Mo. In the last named the instrument has 10,000 pipes.

**Oriental Art.** It is only within recent years that books on the history of art have had anything to say about the wonderful art of India, China and Japan. Now that we have a better understanding of their religion and their ideals, we know that their art at least equals our own. To appreciate Oriental art one must be familiar with Eastern habits of thought, and must be able to see their art through the eyes of the Oriental rather than through one's own. Western peoples love form and wish their art to depict what it has to give in imitative, visual terms, as one views a performance on the stage. Oriental art, like music, does not endeavor to imitate the external world, but by the use of harmony, rhythm and the balance of lines, mosaics of tone and color, just as the musician uses the harmony and rhythm of sounds, Oriental art expresses the sublimest emotions. The greatest of Oriental art had its inspiration in Buddhism. When this religion traveled from India to China, many of the forms of Indian art went with it. This is likewise true of Buddhism and art in Korea and Japan. However, China, Japan and Korea used the art of India merely as a suggestion, and each developed out of its own interpretation of the Buddhist religion, an art peculiarly its own. Each of these countries has produced a beautiful style of temple architecture, which in each case has been richly and marvelously decorated in wood carving, which in turn has been enriched with wonderful color and gold.

America is more familiar with Chinese and Japanese art than with that of India or Korea, for the reason that we have in this country some of the greatest masterpieces of the painting of these two countries that are in existence. The Boston Museum of Art has a very notable collection, and in addition to this, Mr. Charles L. Freer of Detroit has brought to this country such examples of Chinese and Japanese painting as are

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not included in the Boston collection, which he has bequeathed to the United States for a national museum. These two collections of Chinese and Japanese art give America a wonderful chance to study this art of the East in all its stages of development.

Chinese pictorial art, when compared with that of Egypt, is modern, whereas in relation to Japanese painting it is quite ancient. There seems to be no trace of any native Chinese art of this kind before the time of Buddhism in China, whither it came from India during the reign of Emperor Ming, in 62 A. D. There are records of paintings of dragons and of Buddhist gods and goddesses that were made for the decoration of temples previous to the seventh century.

In the eighth century there were two famous painters who were employed to do some decorative work for the government. During the Sung dynasty between 960 and 1206 there were many painters, among whom were Li Lung-yen (or Ririu-min, as the Japanese know him) and Negan Hwui (or Ganku in Japanese). The former was famous for his Buddhist pictures, his drawings of landscapes, horses and the figure. He is represented in the British Museum by a painting called the *Nirvana of Sakyamuni*. The latter was known as the last of the great masters who so strongly influenced Japanese painting. The Yuen dynasty between 1260 and 1450 had many painters of horses, tigers, and birds, the most famous of which, perhaps, was Chao Meng-fu, whom the Japanese call Chosu-go. The Ming dynasty between 1450 and 1628, like the Yuen, shows almost an absence of religious paintings, but many landscapes, birds, flowers, animals and figures.

In China and also in Japan, painting was a direct outgrowth of writing. For centuries there was the greatest admiration for the ability to write beautifully; and to write Chinese and Japanese characters is to be able to control the brush to a degree that is impossible to one of Western birth. In learning to write, the Chinese learn to master the painter's chief tool, and it only remains for him to draw objects instead of the characters of writing. The Chinese painter cares little about representing things as they look in the truth of light and shade, perspective, etc., but tests his work by the character, directness and vigor of the lines used. The Chinese painted both on paper and on silk, on which they used either ink or an opaque water color of very durable quality.

The Chinese painter applied his art to such crafts as wood engraving, decoration of pottery, lacquer and embroidery.

Sculpture, except as it is used in decorative wood carving, was not a natural means of expression to the Japanese. It was soon abandoned for the art of the writing brush. Sculpture, therefore, manifested itself early in the history of this art. It is restricted, almost entirely, to huge bronze statues of Buddha, among which are the Buddhas of Nara and Kamakura, the latter of which is a seated figure nearly 50 ft. high. It was completed in 1252, while the former was finished in 750. Besides colossal bronzes there are many wooden temple statues of Buddha and other gods and goddesses. Japanese sculpture is very vigorous in treatment. The sculptured decoration of the temples and temple furnishings is rich in its design and its use of symbols and color.

Japanese painting divides itself into seven distinct movements; namely, the Buddhistic from the ninth to the twelfth centuries; the Yamato-Tosa from the tenth to the fourteenth centuries; the Sesshiu from 1421 to 1507; the Kano from 1400 to 1750; the Okio, or Shijo, from about 1750 to the present period; and the Ukioye from about 1640 to the present time.

The Buddhistic School produced most of the sculpture of Japan and represents the first attempt at painting. It was exclusively religious and was strongly influenced in spirit, treatment and color by the painting of India and China. Its greatest artists were Kanaoka and Hirotaka, both of whom painted temple and

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palace decorations. Its colors were rich blues, reds, greens and gold.

The Yamato-Tosa School, though spoken of as one, was in reality two different movements, the first of which was influenced by the Chinese, while the latter was thoroughly Japanese. Most of the great Tosa paintings depict various phases of Japanese feudalism, the life of the court and of the soldier.

The paintings are puzzles to the Westerner until he understands them. The Tosa artist never attempts to show us how a thing looks in a given place and under a given condition of lighting. He never goes to his garden to pluck a flower which he brings to his studio to paint. In painting an iris, he would not draw from the flower but from what he knows of all the flowers of a kind, a knowledge he has been gathering through years of loving observation, striving to depict the spirit of what he draws rather than its form.

The Tosa artist makes the observer feel himself to be looking from a point above the scene. Where houses are shown, the roofs are left off, so that one looks down into the interior and also sees the inside at the same time. The later artists of this school have painted exquisitely, and idealized flowers, birds and other natural forms.

Among the prominent individuals of the Yamato-Tosa group are members of the Minamota and Mitsumoto families; and, later, Nobuzane, a great colorist, Mitsunobu, Mitsuoki and Mitsuyoshi. Tosa color was distinctly Japanese, quite different from that of the Buddhistic School. The predominating colors were gold, white, red, green, yellow and blue, which were used intensely strong, but so broken up and woven together that the result was not glaring but a rich softened gray. The Kano and Sesshiu schools had their inspiration in the calligraphic painting of China.

The next two schools were contempory, and their inspiration was Chinese. They were the Kano and Sesshiu schools, the former of which was founded by Cho Densu, who tried to paint in the style of the Buddhistic artists; his ancestors, however, abandoned this idea and established a new style which was based on the brush line drawing of China. These artists were great designers, and worked for many years in black and white exclusively, but later added color in imitation of the Tosa School. They painted panels, in which, as themes, they used animals, birds, fish, flowers, and trees. Its great masters were Kano Massanobu, Tanyu, Yeitoku and Korin. Korin was a master designer, lacquerer and colorist. Sesshui was the founder of the school that bears his name. He studied in China, and his technique and subjects were similar to those of the Kano School.

The Okio, or Shijo, known as the Naturalistic School, was founded by Okio, who painted such subjects as birds, fish, flowers, trees and landscapes. The realism of Okio was not the same as that of the Western World, which always draws an individual thing in a given moment and light, but was rather a truth to nature that was the result of so thorough a knowledge of nature that it was possible to draw any of her forms without having the thing actually present. Sosen, one of the artists associated with this naturalistic movement, was famous for his paintings of monkeys.

In later years the artists of Japan have been diverted from their national ideals of art by an interest in the art of Europe and America. There, however, are two men still living in Japan, who have endeavored to maintain in their own painting what is best in the ideals of Japanese art; they are Hashimoto Gaho and Ogato Gekko; the former is the chief professor in the Tokyo Academy of Fine Arts.

The Japanese have developed the process of color printing by means of engraving wood blocks to a point of excellence beyond that attained by any other nation. Aside from this wonderful technique, their marvelous design and harmonious color have been the source of inspiration to more than one Western artist; such as Whistler and Monet.

Wood-block printing in black and white had been practiced in China for many centuries in the printing of the text and in the illustration of books, and it was in that way that it was first used in Japan. In the earlier stages of the art, color pictures were printed in outline and then colored by hand. Gradually the process became perfected, until it was possible to print most delicate and intricate designs and get any desired effect. The great Japanese color prints were nearly all produced between 1680 and 1850, since which time the art has been neglected, the printers having spent their time copying old prints, which were usually bad, for the American and European market.

A few of the great print-artists, in chronological order, are Hishikawa Moronobu, Suzuki Harunobu, Katsukawa Shunsho, Torii Kiyonaga, Utamaro, Utagawa Toyokuni, Hokusai, Shunsen, Kunisada and Hiroshige. The most universal genius of them all, no doubt, was Hokusai, who at one time was a painter, designer and print-artist. Hiroshige is famous for his landscapes. Excepting Hokusai, he was the only one of the print-artists who treated the landscape in any other way than as an accessory for the figures.

Even so concise an article on Oriental art as this one is must not overlook the wonders that have been accomplished in these countries in the handicrafts.

In America and Europe our lives have become so complex and our necessities have so multiplied that we have of necessity turned over to the manufacturer, the making of the many things we use. He, in order to keep business booming, makes a product that will not last too long, and then changes the style as frequently as possible. In the Orient, conditions are different. Life is simpler, fewer things are necessities, and these few things are made by hand by craftsmen who love their work, and who put more into it than time and get pleasure out of it as well as money. The few things that are necessary are chosen with the utmost care, and, being handmade and well made, last a long time. The Chinese and Japanese excel as metal workers, enamelers, lacquerers, wood workers, textile workers, printers and potters. The last-named craft is the only one that will be treated here, and, as we import more of the Japanese pottery than of the Chinese, we will deal with that only.

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Japanese pottery is distinguished for refinement of form, varied and wonderfully executed design and unparalleled range of color. The most famous potteries are those of Arita, Kyoto, Kaga, Satsuma and Awari. Satsuma and Arita have produced both pottery and stoneware that compare favorably with anything of the kind that has been made anywhere in the world. The rudiments of this art, as of many others, were learned in China, and the Chinese influence is frequently traceable in the design. Japan is rich in all the materials that are used in the making of pottery and its colors.

In the 13th and 14th centuries there was a preference for the iridescent black, red, brown and dark green of the Raku ware, but late in the 16th century, when the tea ceremony became popular, taste in the matter of pottery underwent a marked change. Ninsei founded kilns that produced Awata, Kiomidzu and Omura wares. Ninsei was very skilled in the use of the brush, and decorated his wares with birds, flowers and human figures in creamy blue, light green and coral glazes. Kenzan and Yeiraku were famous potters who worked during the latter part of the 17th and the early part of the 18th century. Both were great colorists, but somewhat neglected form.

Japanese pottery can best be identified by its color. A soft gray-green is characteristic of the kilns of Sanda-Seiji; grays and salmon of Haji; yellow-brown of Oki; and drip-glazes of Oriba. Satsuma is the most popular of all. It is famous for its soft creamy-white backgrounds and for its soft colors and gold.

The 19th century produced the Bizen ware that is remarkable for its wonderful metallic brown and blue glazes. At

the present time the development of pottery is at a standstill, and many of the kilns are producing inferior articles for the foreign market. See FINE ARTS.

**Origen,** *Or' i jen,* (about 185-about 254), one of the most famous Greek Fathers of the Church, born in Alexandria, of Christian parents. He was educated at the famous school in his native city, where he studied under Clement. At various times he traveled extensively in Palestine and Arabia, going also to Greece and Rome. By being ordained in Palestine he aroused the bitter animosity of the Bishop of Alexandria, who accused him of heresy and followed him with persecution. Origen therefore went to Cæsarea, where he made the school almost as famous as the one in Alexandria. He died about the year 254 as the result of an injury received from torture in prison during the persecution of the Emperor Decius.

Origen was the most illustrious scholar, teacher and writer who had yet appeared in the Church. In his efforts to express Christian truth in terms of Greek philosophy he was a pioneer in the paths of systematic theology, his most noted work in this direction being *De Principiis.* His book *Against Celsus* is the most valuable early defense of the Gospel in existence. Twenty-seven years were spent in preparing his Hebrew and Greek edition of the Old Testament, the *Hexapla.* In his interpretation of the Scriptures he adhered to the allegorical method, which held that each passage contained one or more senses in addition to the literal meaning. His great labors gained for him the name "Adamantine," and his influence upon the Church was felt for many centuries.

**Orinoco,** *O" ri no' ko,* a river of South America, one of the three greatest of the continent. It rises on the Sierra Parima uplands, near the frontier of Brazil, flows north and east and empties into the Atlantic Ocean by several mouths near the boundary of British Guiana. It is 1490 m. long.

**O'riole,** a group of tree birds of the Blackbird Family, common in Europe, Asia and Australia. They are handsome birds and are easily recognized by their yellow and black plumage. In America the name is applied to a different bird.

BALTIMORE ORIOLE; GOLDEN ROBIN; FIREBIRD; HANGBIRD. This beautiful bird is easily recognized by its rich orange breast, under parts and rump, black throat, head and back, the white-barred, black wings and black and orange tail feathers. In size, it is somewhat smaller than the robin. Like some other species, the beautiful males arrive in advance of the females and make their presence known by their clear, melodious whistle and bright plumage. When the female arrives, the wonderful, hanging, woven nest is suspended from an elm, maple or other large tree, generally very high up and at the end of a small branch. The nest forms a bag about seven inches in depth, and is made of fine grass, plant fibers, wool, string or hairs. Sometimes the nest is near a window, and contains brightly-colored threads, which children have placed where the birds could get them. Four to six eggs, spotted and blotched with black and lavender, are laid. During the nesting season large quantities of insects are eaten by the nestlings and the parent birds. This oriole occupies the whole of North America south of the 55th parallel in summer, and in winter migrates to Panama.

ORCHARD ORIOLE. This is another common oriole, which is a trifle smaller than the Baltimore oriole, and has black head, wings, tail and upper back, and chestnut-brown lower back and under parts. The basketlike nest is frequently made in an orchard, and four to six brown-spotted eggs are laid.

In the West and Southwest, several richly-colored orioles live; of these Bullock's oriole is perhaps the most common. It may be known by its orange neck and under parts, its black crown, throat, head and back, the white patch and edgings of wings and the yellow outer tail feathers.

**Ori'on,** one of the equatorial constellations, the hunter attacking Taurus.

Orion is one of the most clearly defined of all the constellations. It is approximately a parallelogram, but is a little narrower at one end than at the other. The beautiful ruddy star of the first magnitude in the narrower end is Betelgeuse. Diagonally across the parallelogram is Rigel, a splendid blue star of the first magnitude. In the center are three stars, the belt, the "Bands of Orion" mentioned in *Job xxxviii, 31.* See STARS; PLEIADES; TAURUS.

**Oris'kany, Battle of,** a battle of the Revolutionary War, fought some two miles west of Oriskany, N. Y., Aug. 6, 1777, between 800 Americans under Gen. Nicholas Herkimer and an equal force from St. Leger's army. This comprised Tories under Sir John Johnson and Iroquois Indians under their chief, Joseph Brant. The Americans were on the way to relieve Ft. Stanwix. In a narrow ravine, some eight miles from the fort, they were caught in an ambuscade, which Brant had prepared. The obstinate and sanguinary struggle which ensued soon became a hand-to-hand fight. One-third of the contending forces were killed and Herkimer was mortally wounded when the Tories and Indians finally fled, leaving the field to the Americans. Partly as a result of this battle, St. Leger retired to Canada a short time afterwards.

**Ork'ney Islands,** a group of islands separated from the northern coast of Scotland by the channel of Pentland Firth. Of the 70 islands, constituting an area of 375 sq. m., about 29 are inhabited. The largest are Pomona, Hoy, South and North Ronaldsay, Burray, Ronsay and Shapinsay. They are generally lowlands with fertile soil, and the climate is mild. Potatoes, barley, oats and turnips are cultivated, and among the industries are sheep, poultry and cattle raising, fishing and the making of hosiery by hand. Kirkwall is the capital. The islands were early inhabited and prior to the tenth century were invaded by Norsemen. The inhabitants are principally of Scotch and Scandinavian origin. Population in 1901, 26,698.

**Orleans,** *Or" la" ahn',* the name of two royal families of France. The title Duke of Orleans was first given to Philip, the fifth son of Philip VI of France, in 1344. In 1392 the title passed to Louis, Count of Valois, the younger son of Charles V, who became founder of the House of Orleans-Valois, and was an important figure during the period of the Hundred Years' War. His eldest son Charles (1391-1465) succeeded him, and was taken prisoner by the English at Agincourt, spending 25 years in captivity. He was noted as a poet. His son Louis, the succeeding duke, ascended the French throne in 1498 as Louis XII, and the Duchy of Orleans was merged with the crown. The title was subsequently held by the younger sons of Francis I and Henry II until 1574, when the last male representative of the House of Valois ascended the throne as Henry III.

The title passed to the Bourbons in 1626, when Louis XIII created his brother, Jean Baptiste Gaston, Duke of Orleans. Upon the death of this prince in 1660 without male issue, the title was conferred the following year by Louis XIV upon his younger brother, Philippe (1640-1701), founder of the present family of Orleans-Bourbon. His son, Philippe, Duke of Orleans (1674-1723), was Regent of France during the minority of Louis XV. The fifth incumbent of this line was Louis Philippe Joseph (1747-1793), known as Egalité, great-grandson of the Regent, who became Duke of Orleans upon the death of his father in 1785. He quarreled with the court, became a member of the Assembly of Notables in 1787, joined the Jacobins in 1789, assuming the name of Citizen Philip Egalité, and voted with the Mountain for the death of the King. In 1793 he was convicted of conspiracy by the Revolutionary Tribunal, although without sufficient evidence, and was executed the same day. His eldest son, Louis Philippe, was King of France from 1830 to 1848. The grandson of the latter, Louis Philippe Robert, Duke of Orleans, born in 1869, is the present head of the

family and pretender to the throne. See LOUIS PHILIPPE.

**Orleans, Maid of.** See JOAN OF ARC.

**Or"nithol'ogy,** the scientific study of birds, their classification, habits, distribution, etc. See BIRDS, subhead *Classification.*

**Ornithorhynchus,** *Aur" ni tho rin' kus.* See DUCKBILL.

**Orontes,** *O ron' teez,* a river of Syria, now called Nahr el-Asi. It rises in the Lebanon Mountains, flows northward as far as Antioch, thence westward to the Mediterranean. Its length is about 250 m. It is not navigable, but is noted for the beautiful scenery along the lower part of its course.

**Orpheus,** *Or' fus,* in Greek myths, son of the Muse Calliope by Apollo, from whom he received a golden lyre upon which he played so exquisitely that even beasts and inanimate nature were enchanted by his melodies. When, shortly after their marriage, his bride, Eurydice, died from a snake bite, Orpheus descended to Hades, armed with his lyre alone. But so mournfully did he sing his grief to the infernal rulers, Pluto and Proserpine, that they agreed to restore his wife to him on condition that he cast not even one glance at her until he had conducted her up into the region of light. Unable to deny himself one comforting look, he saw Eurydice snatched away from him just as they were on the verge of the upper world.

A band of Thracian maids, crazed by rites of Bacchus, seized on Orpheus, who had ignored them through grief for his lost Eurydice, and tore him limb from limb. Gathering the pieces of his body, the Muses buried them in Libethra. There, on his grave, the nightingale sings his sweetest lay. Jupiter placed the lyre of Orpheus in the heavens, where it forms the constellation Lyra.

**Orthoceras,** *Or thos' er as,* a genus of Cephalopods, or marine animals, having coiled shells. They first appeared in the Upper Cambrian system, and fossil remains of several hundred species have been discovered in the Paleozoic formations of all parts of the world. The shell somewhat resembles that of the nautilus, but is straight and cone-shaped. The interior of the shell is divided into a succession of chambers by a series of transverse walls, each with an opening in the center. Remains of 200 species have been discovered, presenting great variability as to size. Shells the size of a barrel have been found, which must have been inhabited by an animal from 12 to 15 ft. long.

**Orthoclase.** *Aur' tho klase.* See FELDSPAR.

**Orthop'tera,** or **Straight-Winged Insects,** a group of Insecta, which includes the cockroaches, locusts, grasshopper, crickets, katydids and others. The class takes its name from the straight forewings of the grasshopper, but the name is not thoroughly comprehensive, since the walkingstick, also a member of this group, has only rudimentary wings, and others of the class have wings that would scarcely be called straight. The Orthoptera differ from the insects of other groups in having biting mouth parts and an incomplete metamorphosis (See INSECTA). The Orthoptera are destructive insects, especially if occurring in large numbers, as they are apt to do in certain seasons. See CRICKET; KATYDID; GRASSHOPPER; COCKROACH; MANTIS.

**Or'tolan,** a name applied to several birds which are used as food, the most common being the European garden-bunting, a member of the Finch Family. These birds, which are about the size of the English sparrow, are captured in nets, and confined in dark rooms where they are fattened by gorging on grains and spices until they weigh about three ounces. They are then ready for the market. The bobolink and the sora rail are also known under this name when sold in the market.

**O'sage Or'ange,** or **Osage,** an ornamental American shrub of the Nettle Family, found native in the region of the Osage River, from which it derives its name. It is a small, bushy tree, which spreads quickly by means of running roots. The branches are tough and short

and grow so thickly that they make an almost impenetrable hedge. The leaves are oval and shining. The flowers are of two kinds: fertile, or those which will bear fruit; and sterile, or those which will not. Those of the first kind grow in long clusters, and the second in a close head. The divisions of the flowers are in four unequal parts. The fruit is a fleshy ball, orange-yellow when ripe and much like the orange in appearance, but with a rougher surface. The pulp is dry and bitter to the taste. The heartwood of the osage is red and is used in the production of a dye; the outer wood is yellow and tough and was a favorite with the Indians for making bows; for this reason it was called by them *bois d'arc*.

**Osage,** *O saje'*, **River,** a tributary of the Missouri. It rises in the eastern part of Kansas, flows eastward through Missouri and joins the Missouri River a few miles below Jefferson City. Its length is about 500 m., and it is navigable for about 200 m. for small vessels.

**Osaka,** *O' za kah,* or **Ozaka,** a city of Japan on the Island of Hondo on the shore of Osaka Bay, 37 m. s.w. of Kyoto. It is popularly known as the "Venice of the East" because of the canals spanned by numerous bridges. Among the public buildings are the Shinto and Buddhist temples, the castle founded by Hideyoshi in 1583, the enclosed palace, the arsenal and the mint. Osaka is an important railroad center, and a fairly commodious harbor has been constructed. The industrial establishments include shipyards, ironworks, sugar refineries and cotton-spinning mills. The town was begun by Rennio Shonin in 1495-96, who built a temple on the present site of the famous castle. In 1583 Hideyoshi made Osaka his capital, and it was opened to foreign trade in 1868. Population in 1908, 1,226,590.

**Oscar,** *Os' kar,* **II** (1829-1907), King of Sweden and Norway. He studied at various famous universities and then travelled extensively. In 1857 he married Sophia, daughter of the Duke of Nassau, and in 1872 he succeeded his brother Charles XV as King of Sweden and Norway. His prosperous reign was marked by the development in railroad building, manufactures and agriculture in both countries. When Norway and Sweden were separated in 1905, the King's tactful policy prevented war between the two countries. He published an autobiography of Charles XII and translated Goethe's *Faust* and *Tasso*.

**Osceola,** *Os" e o' la,* an Indian chief, the son of an English trader and of a Creek Indian woman. Removed to Florida, he became chief of the Seminoles and stubbornly resisted the attempts of the United States to transfer the tribe to Arkansas. After several years of warfare he was captured by General Jessup and imprisoned in Ft. Moultrie, Charleston, S. C., until his death in 1838. See SEMINOLE.

**Osh'kosh", Wis.,** a city and county seat of Winnebago Co., 49 m. s.w. of Green Bay and 75 m. n.w. of Milwaukee, on the west shore of Lake Winnebago at the mouth of the Upper Fox River, and on the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Minneapolis, St. Paul & Sault Ste. Marie and other railroads. Lines of river steamboats connect with the Wisconsin River at Portage and with the Great Lakes at Green Bay. Interurban electric lines also connect Oshkosh with Fond du Lac, Omro, Neenah, Menasha, Appleton, De Pere, Green Bay and other towns and cities. The city lies on both sides of the river, here spanned by a number of bridges, and reaches back to Lake Butte des Morts, an expansion of the river. Oshkosh has an important trade and the city is the commercial center for a considerable portion of central Wisconsin. Lake Winnebago is a noted summer resort and the annual regattas of the Inland Lake Yachting Association take place there. There are also Chautauqua grounds on the lake front. Oshkosh has well-paved and parklike streets and many beautiful residences. North Park, containing 60 acres, located on the lake front, is the most noteworthy of the park system.

Among the public buildings are the Harris Public Library, the Orville Beach Manual Training School, county courthouse, city hall, Federal Building, banks, an opera house and substantial business and wholesale houses. There are about 39 churches. The educational institutions include a state normal school, the largest in the state, a manual-training school, conservatory of music, a public library and museum, a high school, public and parochial schools, several business colleges and a school of telegraphy. Among the benevolent and charitable institutions are St. Mary's and other hospitals. The Northern Hospital for the Insane, the county hospital for the incurable insane and the county almshouse are located about three miles from the city. Oshkosh has extensive lumber and flour mills, sawmills, carriage and wagon factories, furniture factories, breweries, agricultural-implement works, sash, blind and door factories, match works, shingle mills, vinegar works, foundries and machine shops, marine-engine works, boat yards, horseshoe and thrashing-machine factories and grass-twine works. Farming and dairying are important industries in the vicinity.

The first permanent settlement here was made in 1827 and the settlement was known as Saukeer. The name was changed to Oshkosh in 1840 in honor of a Menominee Indian chief who befriended the early settlers. A city charter was granted in 1853. Population in 1910, 33,062.

**Osier,** *O' zher,* or **Basket-Willow,** a low, bushy shrub of the Willow Family, whose twigs, on account of their toughness and pliability, are widely used in basketry. The shrub is a native of Europe but is frequently found in the United States on low ground and along the banks of streams, where its growth forms a close thicket. The wood is light and soft and covered by a light green, bitter-tasting bark. The leaves, like those of all willows, are long and narrow; in color they are light green and in some climates they are evergreen. The flowers, which appear before the leaves, are often the earliest spring blossoms. There are two kinds of flowers: one of these is borne in short, scaly heads, not at all conspicuous; the other, rather more attractive, is borne in fluffy catkins with bright yellow, protruding stamens. These flowers depend upon insects to pass the pollen on to the seed-bearing flowers and so are provided with honey-bearing cells and have a slight fragrance. The fruit is a pod, which opens by splitting in halves, disclosing many small seeds, bearing tufts of cottony down.

**Osi'ris** (called the Good), in Egyptian myths, god above all, husband and brother of Isis and father of Horus. After having rescued the Egyptians from barbarism and instructed in agriculture and many arts and sciences not alone these people but various nations in Asia and Europe, he was murdered by his brother, Typhon. Thereupon he became judge of the dead. Moreover, Osiris represented the sun below the horizon. The soul of Osiris was fabled to be in the sacred bull, Apis. He was represented as a mummy in human form, wearing a tall cap and bearing a flail and crosier. His festival resembled that of Bacchus.

**Os"kaloo'sa, Iowa,** a city and the county seat of Mahaska Co., 62 m. s.e. of Des Moines, on the Chicago, Rock Island & Pacific, the Chicago, Burlington & Quincy, the Iowa Central and other railroads. The town also has interurban electric-railway service. Important industries are mining, farming, stock raising and manufacturing. The manufactures include flour, packed meat, iron and brass goods, steam and hot-water heaters, wagons, woolen goods, cement blocks, sewer pipe and vitrified brick. At Oskaloosa takes place the annual meeting of the Iowa Society of Friends, and here are located Penn College, a Friends' institution, and the Iowa Christian College. At the University Park, a village adjoining Oskaloosa, is the Central Holiness University, at which the annual camp meeting of the National Holiness Association is held. Oskaloosa has a public library and a fine post-office build-

ing. It also contains a statue of Mahaska, a chief of the Iowa tribe. The place was settled in 1843 and ten years later was incorporated. Population in 1910, 9466.

**Os'ler, Sir William** (1849- ), a celebrated physician, born in Bondhead, Ontario, and educated at Trinity College, Toronto, McGill University, University College, London, and the universities of Berlin and Vienna. He was professor of the institutes of medicine at McGill from 1874 to 1884 and professor of clinical medicine at the University of Pennsylvania from 1884 to 1889, when he there became professor of the principles and practice of medicine and physician-in-chief at Johns Hopkins Hospital. In 1905 he became honorary professor of medicine at Johns Hopkins and regius professor at Oxford. Dr. Osler has been an extensive writer on professional subjects.

**Os'mium,** an element of the platinum group, closely resembling platinum. It is a lustrous, silver-white metal having a high melting point and oxidizing only at high temperatures. Osmium is the heaviest known substance. It is found chiefly in platinum and iridium ores and is used as an alloy of these metals. With platinum it is used for making the standard measures of length and weight, and with iridium it is used in making compass bearings and tips of gold pens. Electric-light filaments are frequently made of pure osmium. Osmium was discovered by Tennant in 1804.

**Osmo'sis,** a process of diffusion whereby two liquids, of different kinds and separated by an animal membrane, interchange until the densities of the two become more nearly the same. A simple experiment illustrating osmosis is easily performed. If the shell be removed from the small end of an egg so carefully that the thin membrane is not broken, and this egg is set in a beaker of salt water, after a time it may be noticed that a part of the egg has become mixed with the salt solution, and an examination will show that even more of the salt solution has entered the egg, although there are no visible pores in the membrane. It is by means of osmosis, sometimes called dialysis, that the lymph from the alimentary canal enters the capillaries, while the blood gives up its waste product; and in the same way plants are nourished by the sap. The inward flow of a liquid, as the lymph into the capillaries, is called endosmosis; and the outward flow, as that of the waste products out from the capillaries, is termed exosmosis.

**Os'prey,** or **Fish Hawk,** a large bird of the Hawk and Eagle Family. The hooked beak, strong feet with their sharp talons, white under parts, grayish-brown upper parts and tail with black and white bands easily distinguish this bird. The nest is placed in a variety of situations, on the ground, on cliffs or in trees, and is made of sticks and other material, lined with corn leaves, seaweed, bark, etc. It contains three eggs spotted more or less heavily with brown. The same nest is used year after year, and in some localities the ospreys nest in large colonies. The food consists entirely of fish, which the bird catches with great dexterity, often diving into the water from a considerable height. The osprey breeds from Alaska to Mexico and migrates to the West Indies and northern South America.

**Ossian,** *Osh' an,* a legendary character of Celtic literature. According to tradition he was the son of Finn, and belonged to Ireland and to the third century A. D. He commanded the Fenians who were conquered in the Battle of Gabhra in 283. Poems about him spread over Ireland and Scotland, and he has been popularized again by the recent Irish literary revival. For the Ossianic revival in Scotland see MACPHERSON, JAMES.

**Os'sining, N. Y.** (formerly Sing Sing), a city of Westchester Co., 31 m. n. of New York City, on the east bank of the Hudson River where it expands into Tappan Bay, and on the New York Central & Hudson River Railroad. It is picturesquely located on rising ground and has many handsome residences of New York business men. The Sing Sing

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# INTERESTING BIRDS

RUBY-THROATED HUMMING BIRD

BARN SWALLOW

TREE SWALLOW

OSTRICH

CARRIER PIGEON

CHIPPING SPARROW

SONG SPARROW

ENGLISH SPARROW

COWBIRD

CHESTNUT-SIDED WARBLER

State Prison located here is one of the most prominent in the United States. There are several private academies and boarding schools. The arch of the Croton Aqueduct, 88 ft. in span and 70 ft. above water, with an arched highway bridge, is one of the various points of interest. There are manufactories of iron, machinery, leather, medicinal articles, etc. It was settled in 1700 on part of the Phillipse Manor and incorporated in 1813. The name was changed to Ossining in 1901, the former name, Sing Sing, having become objectionable on account of its association with the prison. Population in 1910, 11,480.

**Os'soli, Marchioness.** See FULLER, SARAH MARGARET.

**Ostend' Man"ifes'to,** a noted dispatch signed at Ostend, Belgium, Oct. 9, 1854, by James Buchanan, John Y. Mason and Pierre Soulé, at that time the United States ministers to Great Britain, France and Spain respectively. These ambassadors met in the city of Ostend, at the suggestion of President Pierce, to discuss the Cuban question. The dispatch sent to the United States Government declared that the purchase of Cuba from Spain by the United States would be desirable, but that if Spain refused to sell, the United States should forcibly acquire the island. The Ostend Manifesto, with certain filibustering expeditions, which had sailed from Southern ports against the islands of the Spanish West Indies, especially Cuba, increased the agitation in the free states against the slave power, which the North believed was attempting by these measures to extend slave territory. This declaration nearly severed diplomatic relations with Spain. It also aroused adverse sentiment throughout Europe and was not approved in the United States in the platforms of either party.

**Osteopathy,** *Os" te op' a thy,* the practice of curing disease without the use of drugs, based upon the principle that perfect health depends upon perfect anatomical structure. Any imperfections of structure tend to retard the circulation of the blood and hence hinder it from carrying away diseased tissue or dead cell-matter. Osteopathy seeks to locate the displacement of bone, muscle or nerve which has caused the difficulty and, by mechanical manipulation, to restore it to its normal position and the body to health. Germ disease, it is claimed, cannot successfully attack a body which is normal, since the body contains within itself the power to combat the disease. The founder of the osteopathic school of medicine was Dr. Andrew T. Still of Kansas. In 1892 the first school of osteopathy was opened at Kirksville, Mo.; since then many other colleges have been established and the science has advanced to such an extent that all medical schools teach certain departments of osteopathic treatment. Most physicians, whether homeopathic or allopathic, sanction osteopathic treatment in many diseases but object to its use in all, and in this most modern osteopaths agree.

**Os'trich,** a bird of the Ostrich Family, to which the emu and the cassowary belong. A full-grown male is from seven to eight feet tall and weighs from 200 to 300 lb. Such a bird can easily pluck fruit from a branch ten feet from the ground. The head, neck and legs are bare, and the eyes are so placed that the bird can see in all directions. The body of the male is black, with white plumes in the wings and tail. The plumage of the female is grayish-brown. The feet have but two toes. Ostriches cannot fly but they are very swift runners, outdistancing the fleetest horse. They are so strong that now and then one in captivity is trained to carry a boy or man on its back.

The males are fierce fighters and dangerous antagonists, using both beak and feet in attack or defense. The bird kicks by striking forward, and a blow from the foot is sufficient to inflict serious, if not fatal, injury. The nest is a hollow in the sand. In the wild state the eggs of several females are gathered in one nest, and the male sits upon them at night, but during the day they are incubated by the heat of the sun. In captiv-

ity, however, the nesting habit is changed. The birds are usually kept in pairs, each pair in a separate inclosure. From 15 to 18 eggs are laid, and the female sits upon them during the day and the male at night. This is doubtless due to the fact that ostrich farms are located in regions where the heat of the sun is not sufficient for incubation. The period of incubation is 40 days. The eggs have an ivory-white appearance and weigh about three pounds each; the shell of an ostrich egg will hold the contents of 30 hen's eggs.

Ostrich Farming. For a long time ostrich plumes have been used for decorative purposes and years ago the demand for these plumes became so great that it could not be supplied by hunting wild birds. This led to raising ostriches in captivity. Ostrich farming has reached its greatest development in the Cape of Good Hope Province, where more than 275,000 birds are now on farms. Ostrich farms are also found in California, Arizona, Florida and Texas.

When ready for plucking, the bird is placed in a three-sided inclosure and a hood slipped over its head. The large feathers are clipped with scissors, so that the ostrich suffers no pain from the plucking. As long as the hood remains over the eyes, the bird is perfectly quiet. The largest plumes are taken from the wings and tail, the black and white coming from the male and the gray from the female. A bird yields from $30 to $60 worth of plumes from a plucking, and they are usually plucked three times a year.

**Os'trogoths.** See Goths.

**Oswe'go, N. Y.,** county seat and port of entry of Oswego Co., 35 m. n.w. of Syracuse, on Lake Ontario at the mouth of the Oswego River and on the New York, Ontario & Western, the New York Central & Hudson River and the Delaware, Lackawanna & Western railroads. The city is regularly laid out and fine drives skirt the river and the lake shore. The Gerritt Smith Library and a state normal and training school are located here. Among the points of interest are the United States Life-Saving Station, state armory, arsenal, etc. The old French fort possesses historic interest. Oswego has a good harbor which is formed by the mouth of the river, and it has large shipments of lumber, grain and coal. It has several foundries, machine shops, match factories, oil works, manufactories of flour, oil-well supplies, car springs, textiles and knit goods and extensive starch factories. Owing to its location, Oswego was an important post in King George's War and the French and Indian War, and in 1759 it was the center of military operations in this part of the country, and the point from which General Amherst with 10,000 men started to meet Wolfe at Quebec. Oswego was incorporated in 1828 and chartered as a city in 1848. Population in 1910, 23,368.

**Oswego, Battle of,** an engagement of the War of 1812, fought May 5, 1814, at Oswego, N. Y. Sir James Yeo, with about 3000 soldiers and marines, attacked the fort garrisoned by Colonel Mitchell and 300 men. The first attack was repulsed by a cannon on the shore of Lake Ontario, but the second, May 6, proved successful. The garrison retreated up Oswego River, and the British left, after having burned the barracks and having captured the supplies and a war vessel. The Americans lost 69 men; the British, 19 killed and 75 wounded.

**O'tis, Elwell Stephen** (1838-1909), an American soldier, born at Frederick, Md. He graduated from Rochester University in 1858, completing a course in law at Harvard in 1861. In 1862 he became captain of the 140th New York Infantry, and led this force through many important battles. He was wounded in 1865 and discharged with rank of brigadier-general of volunteers. The year following he was made lieutenant-colonel in the regular army and served in the West from 1867 to 1885, during the last four years of that time organizing and managing the Leavenworth School of Infantry and Cavalry. From 1885 to 1890 he was commandment at Assini-

boine, Mont.; from 1890 to 1893 was superintendent of the recruiting service, with rank of brigadier; commandant of the Department of Columbia from 1893 to 1897 and of the Colorado from 1897 to 1898; and was then made commander of the United States forces in the Philippines, and also military governor. In 1900 he was promoted to the rank of major-general and was given command of the Department of the Lakes, retiring from active service in 1902.

**Otis, James** (1725-1783), an American patriot, born at West Barnstable, Mass. He graduated at Harvard in 1743, was admitted to the bar, and soon rose to the foremost rank in his profession in Boston, gaining an enviable reputation for eloquence, learning and integrity. In 1761, when Otis was advocate-general for the Crown, England attempted to enforce the navigation acts by the means of search warrants known as Writs of Assistance, and Otis resigned rather than be a party to the enforcement of the writs. He argued the cause of the colonies before the court in a remarkable speech of five hours' duration. John Adams, who was present, says that on that day "the child Independence was born." The same year Otis was chosen a representative to the colonial assembly, where he opposed paying out money for enterprises not authorized by the assembly; and he further argued this point in 1764 in a pamphlet entitled *The Rights of the Colonies Vindicated,* which had great influence. He assisted in the calling of the Stamp Act Congress in 1765, of which he was a leading member, and he served on the committee which prepared an address to the British Parliament. In 1769 he had a controversy with some British officers who assaulted him so severely that he lost his reason. There were lucid intervals afterwards, however, in one of which he fought at the Battle of Bunker Hill. The speeches and writings of Otis gave great impetus to the independence movement.

**Otranto,** *O' trahn to,* **Strait of,** a passage connecting the Ionian with the Adriatic Sea. Its narrowest width, 45 m., is opposite Otranto in Italy and Cape Linguetta in Turkey.

**Ottawa,** *Ot' a wah,* a tribe of North American Indians. They belonged to the Algonquian family and were found by the French in Canada and in the Upper Peninsula of Michigan. They were friendly to the French but fought for the English in the Revolutionary War. Pontiac was their celebrated chief. They live in Ontario, southern Michigan and Oklahoma. See PONTIAC.

**Ottawa,** the capital of the Dominion of Canada and of Carleton Co., Ontario, is situated at the junction of the Ottawa and Rideau rivers and on the Canadian Pacific, Grand Trunk, Canadian Northern and other railroads, 116 m. w. of Montreal. An electric railway connects it with Hull, Aylmer, Britannia and nearby points, and steamers connect with Montreal, Kingston and other lake and river points through the Rideau Canal and the Ottawa River.

The city stands on a cluster of hills extending from 60 to 155 ft. above the river, and is divided by the Rideau Canal, the western section being known as Upper Town and the eastern as Lower Town. The beautiful scenery surrounding the city is enhanced by the Chaudière Falls at the west end, which are 1000 ft. wide and 40 ft. high, and the Rideau Falls, so called by the early French explorers because of their curtainlike appearance, which carry the waters of the Rideau River into the Ottawa at the northeast end of the city. Ten bridges cross the Rideau River within the city limits and three span the Ottawa, connecting the city with Hull in the Province of Quebec. Among the public parks are Major's Hill, Strathcona and the Parliament Building grounds. Ottawa is the residence of the governor-general of Canada, the seat of the United States consul-general and the see of the Roman Catholic archbishop and that of the Anglican bishop.

The crowning architectural feature of the city is the splendid group of Italian Gothic government buildings on the summit of Parliament Hill, whose limestone

bluffs rise to a perpendicular height of almost 150 ft. above the river. These buildings form a quadrangle with the open side towards the city. They are built of Potsdam sandstone from the neighboring district at a cost of about $4,000,000, and cover four acres of ground. The foundation stone was laid by Edward VII when he visited Canada in 1860 as Prince of Wales. Other buildings include the Basilica, or Roman Catholic Cathedral of Notre Dame, Christ Church Cathedral, the city hall, Rideau Hall, which is the governor's residence, Victoria Memorial Museum, Royal Observatory and Royal Mint, besides numerous churches and charitable and benevolent institutions. The city is the seat of the Ottawa Roman Catholic University, the Ottawa Ladies' College, a collegiate institute and a provincial normal school. The Parliamentary library contains about 400,000 volumes, and the public, or city, library, 50,000 volumes. The Château Laurier and the Grand Trunk Railway Station, two large and handsomely designed buildings in white limestone, were opened in 1912.

It was down the Ottawa River that the Algonquin and Huron Indians conveyed their annual stock of furs. Later the cargoes of peltry were replaced by rafts of square timber brought down by the Ottawa and its tributary rivers to the St. Lawrence to be loaded on seagoing vessels at Quebec. This business began in 1806 and was continued for a century. The forests on the Upper Ottawa supply the mills at Ottawa city and Hull, where power is generated by the Chaudière Falls, and the annual output of lumber is very extensive. This immense water power is also used for factories, flour mills and the manufacture of matches, paper, leather, indurated-fiber ware, furniture, carriages, brick and tile.

The site of Ottawa was visited by Champlain in 1613 but no permanent settlement was made there until almost two centuries later. During that time the Chaudière portage was the main thoroughfare between Montreal and the great Western fur country. The founder of the city was Colonel By, the promoter of the Rideau Canal, and it was named Bytown in his honor, but the old Indian name of Ottawa was restored at the time of incorporation, 1854. Queen Victoria selected it as the capital of Canada in 1858. Population in 1911, 87,062.

**Ottawa, Ill.**, a city and the county seat of La Salle Co., 83 m. s.w. of Chicago, at the confluence of the Fox and Illinois rivers, on the Illinois and Michigan Canal and on the Chicago, Burlington & Quincy and the Chicago, Rock Island & Pacific railroads. The city is an important manufacturing and commercial center, having an active trade in grain and other products. Among its manufactures are cigars, buggies, wagons, carriages and farming tools, pottery, crockery, glass and silver-plated ware, tile and terra cotta, organs, pianos, collars, harness and fire brick. It is the seat of St. Francis Xavier Academy (Roman Catholic) and of the Pleasant View College (Lutheran). Prominent features of the city are the Ryburn Memorial Hospital, the Illinois Appellate Court Building, the city and county buildings, Odd Fellows' and Reddick's public libraries and four parks. Ottawa was incorporated in 1837. Population in 1910, 9535.

**Ottawa, Kan.**, a city and the county seat of Franklin Co., 58 m. s.w. of Kansas City, on the Osage River and on the Missouri Pacific, the Atchison, Topeka & Santa Fe and other railroads. Near the city soft coal and natural gas are found, and a substantial trade in grain and live stock is carried on. In and near the city are carriage factories, flour mills, machine shops, a fence factory, a creamery, nurseries, grain elevators, soap works and a foundry. Among the attractions of the city are the Ottawa University, a thriving Baptist institution founded in 1865; a Carnegie library; and a public park, in which there is held an annual Chautauqua Assembly. There are also several conspicuous buildings, including the courthouse, theater and fine churches. Settled in 1854, Ottawa was first chartered as a city in 1866. Population in 1910, 7650.

**Ottawa River,** a river of Canada, forming part of the boundary line between Ontario and Quebec. It rises 160 m. n. of Ottawa in the Laurentian divide, which separates the basin of the St. Lawrence from that of Hudson Bay, and flows southwest 625 m., emptying into the St. Lawrence, of which it is the chief tributary. Its tributaries are the Gatineau, Rideau and the Rivière du Lièvre. Several rapids and cataracts, chief among which is the Chaudière Falls, render navigation impracticable above a distance of 250 m. from its mouth, except for the passage of timber from the interior forests to the lumber mills of Hull and Ottawa. The Ottawa was the old portage trail for the fur traders and explorers for a century and a half.

**Ot'ter,** a sharp little animal of the Weasel Family, inhabiting both land and water and making its living by fishing. Its body is long and sinuous, fitted for rapid turns and dives in the water, where its webbed feet act as paddles and its strong, tapering tail makes an excellent rudder. The small black eyes are set close to the nose in such a position that the otter can easily follow the movement of its prey in the water, whether it is above, below or behind. The ears are small and their openings may be closed at will; the jaws are strong and the teeth sharp. The fur of the otter is valuable, being soft and generally rich brown, black or frosted in color. The North American otter was once found throughout the continent but it is not now common except in the North. Near fishing streams otters are considered pests, since they prove to be much more able fishermen than those who must carry poles and lines. Otters are very playful and in winter carry on the sport of coasting with as much enjoyment as do boys. They spread their short forelegs in front of them and coast down a snow-covered ridge, delighting in a slide which ends in a long skate across an ice-covered pond or a dip in a running stream. In captivity they are equally playful and become tame, but are rough playmates and readily use their sharp teeth.

The sea otter, which furnishes the most costly of furs, inhabits Pacific coasts, especially near Alaska, Kamchatka and California. It is said that their birth always takes place upon floating beds of kelp, and some of the species spend their entire lives there. The mother, who provides for the young until they are nearly full-grown, sleeps upon her back in the water with her young, or "pups," held tightly in her forepaws.

**Otter, William Dillon** (1843- ), a Canadian soldier, born in Ontario and educated at Upper Canada College and at the Royal Military School. Entering the volunteer militia in 1861, he was promoted lieutenant in 1864 and served on the Niagara frontier and throughout the Fenian Raid. His advance in the service was steady, and after he had served with distinction in South Africa, 1899-1900, where he was attached to General Buller's staff in Natal, he was promoted major-general, 1910. The same year he became inspector-general and chief military adviser to the minister of militia.

**Ot'to I,** surnamed the Great (912-973), the founder of the Holy Roman Empire of the German nation. He was elected King of Germany in 936, and immediately upon assuming control of his kingdom was forced to put down rebellions among the Slavs and Hungarians. Later, in 951, he invaded Italy, the northern part of which he subjugated. In 961 he again entered Italy and the following year received from Pope John XII the imperial crown, thus founding the Holy Roman Empire of the German nation. He early asserted his authority by effecting the deposition of John and causing Leo VIII to be elected pope. Later in his reign Otto made war on the Italian provinces of the Byzantine Empire. See Holy Roman Empire.

**Ot'toman Empire.** See Turkey.

**Ottum'wa, Iowa,** a city and county seat of Wapello Co., 90 m. s.e. of Des Moines, on the Des Moines River, and on the Chicago, Burlington & Quincy, the Wabash, the Chicago, Rock Island & Pacific and the Chicago, Milwaukee & St. Paul railroads. The city is built on

both sides of the river, which furnishes abundant water power. Valuable coal beds are in the immediate vicinity. Ottumwa is the commercial and distributing center of southern Iowa and northern Missouri. With these facilities the manufacturing interests are extensive. The chief products of the industrial establishments are fresh and packed meat, butter, flour, hay tools, agricultural implements, wooden handles, steel gears, office and store furniture, cigars, candy, stoneware, brick, tile, mining tools, mine equipment, steam boilers and engines, structural iron, corrugated culverts and tanks, and feed and foundry products. A large trade in manufactured articles, fruit, coal, poultry, live stock and farm products is carried on.

Ottumwa is built upon a series of natural terraces, which recede from the river, and has a number of prominent buildings, among them the Federal Building, Y. M. C. A. and Y. W. C. A. buildings, Union Railway Station, courthouse, city hospital and public library. Among the educational institutions are St. Joseph's Academy, grammar schools, a high school and parochial schools. The city is the headquarters of the Ottumwa division of the Southern Federal Judicial District Courts of Iowa, and here are held sessions of the United States District and Circuit courts. The place was settled in 1842 and incorporated as a village in 1844; the city has the commission form of government. Population in 1910, 22,012.

**Ot'way, Thomas** (1652-1685), an English dramatist, born in Sussex. After studying at Oxford he became an actor; failing in this, he turned to play writing. His two best plays—*The Orphan* and *Venice Preserved*—are representative of the Restoration tragedy. Otway's plays, in spite of artificial plots, have genuine passion, and he excelled in depicting the pathos of affection. See DRAMA.

**Ouida,** *We' da.* See RAMÉE, *Ra ma'*, LOUISE DE LA.

**Ounce,** or **Snow Leopard,** a large and beautiful member of the Cat Family, closely related to the leopard and much resembling it. It lives in cold regions of Asia, particularly in the highlands of Tibet and near the snow line of the Himalayas. Its coat is gray and marked with black, irregular, leopardlike spots which render the thick, long hair very beautiful and the pelts very valuable. The tail is long and bushy. The ounce makes its home in rocky dens, whence it comes out to prey upon goats, sheep and other small animals.

**Ounce.** See WEIGHTS AND MEASURES.

**Ouzel,** *Oo' z'l,* a bird of the Dipper Family. The water ouzel, or dipper, is about the size of the robin (eight inches). These sprightly little birds, with their slate-gray bodies and brownish-tinged heads and necks, are inhabitants of more or less mountainous regions, in the neighborhood of streams. The nest is oven-shaped, with an opening on one side, and is made of moss. It is always placed near running water and contains three to five white eggs. The ouzels somewhat resemble some of the wrens in their peculiar bobbings. They seem quite at home in the water, even swimming under water for considerable distances.

In England, the name ouzel, or ring ouzel, is applied to a blackbird and to a rail which is called the brook ouzel.

**Ov'enbird",** a bird of the Warbler Family. The ovenbird is about six inches long, the back is brown, the crown is dull orange and the white breast is spotted with black. Its thrushlike breast has given it the name of golden-crowned thrush. It is one of the commonest of our woodland species during the nesting season, but at other times it is shy and difficult to observe. Its song is very characteristic and has been described as resembling the word *teacher* repeated several times in an ascending key. The nest is an arched or domed structure of leaves and roots, with a lining of fine roots and hair, and a large opening placed at the side. Three to six cream-colored, brown-spotted eggs are laid. The nesting season begins in May and two or three broods are raised. The ovenbird ranges from Alaska south to

northern South America, migrating in winter to southern Florida, Mexico, the West Indies and the United States of Colombia.

**Ov'id** (43 B. C.-17 A. D.), the name generally applied to the Roman poet, Publius Ovidius Naso. He was born at Sulmo, high among the Apennines in the country of the Pæligni. He was educated for the bar and carefully trained in the art of declamation, but it is doubtful that he ever practiced in his profession. After studying at Athens and making a tour of Asia and Sicily, he withdrew to a gay and licentious private life. In 8 A. D. the Emperor Augustus issued to him an edict of banishment, the cause of which is a mystery, and Ovid was commanded to depart for Tomi, a town on the desolate shores of the Black Sea. There he died, all efforts to shorten his banishment being in vain, and he received final honors from the people of Tomi, among whom he was a favorite. Among his works are love elegies, *Art of Love, Love Remedies* and the beginning of the *Metamorphoses* and the *Fasti*, his two best-known writings. All his verse is varied and vigorous, touched by a lively fancy and executed by a hand trained rather for producing effects of music and color than for sober exactness and self-restraint.

**Owen,** *O' en,* **Robert** (1771-1858), an English social reformer, born in North Wales. At 18 he was part proprietor of a cotton mill, and when he became head of similar mills at New Lanark, Wales, he there introduced reforms which made him celebrated throughout Europe. Believing in a modified communism, he came to the United States in 1824 and founded a community at New Harmony, Ind., which proved a failure, as did subsequent experiments in Great Britain and Mexico.

**Owen Meredith.** See LYTTON, EDWARD ROBERT BULWER.

**O'wensboro, Ky.,** a city and the county seat of Daviess Co., 114 m. s.w. of Louisville, on the Ohio River and on the Louisville & Nashville, the Illinois Central and the Louisville, Henderson & St. Louis and other railroads. Additional transportation facilities are provided by river steamboats. The city is situated in a productive agricultural region and one which abounds in mineral wealth. Coal, iron, lead, zinc, building stone, oil and clay are among the natural resources. Within the city are various manufactories and other industrial plants, including whiskey and brandy distilleries, a furniture factory, wagon, carriage and automobile works, flour and planing mills, a wheel factory, a cellulose factory and the only stenotype factory in the world. The trade in tobacco is extensive, Owensboro being one of the most important leaf- and strip-tobacco markets in the United States. There is a fine system of public schools. The chief educational institutions are the Owensboro College for Women (nonsectarian), and St. Francis Academy, a Catholic school for boys. The Federal Building and county courthouse are prominent buildings of the city. There are about 24 churches. Hickman Park and a Chautauqua Assembly ground are in the vicinity. The place was permanently settled in 1798 and called Yellow Banks. In 1815 the town was platted and the name changed to Rossborough; two years later it received its present name in honor of Col. Abraham Owen, an Indian fighter. Owensboro was incorporated in 1866. Population in 1910, 16,011.

**Owen Sound,** a town in Ontario, Canada, the capital of Grey County, situated on the Georgian Bay, 99 m. n.w. of Toronto, and on the Canadian Pacific and Grand Trunk railways. The harbor, with a dry dock 300 ft. long, is one of the best on Lake Huron, and is a terminus for the Canadian Pacific and other steamship lines. The fine public buildings and the extensive manufactures and trade give evidence of the flourishing condition of the town. Mill machinery, agricultural implements, furniture, bricks and sewing machines are manufactured. There are also large grain elevators, flour mills and sawmills. Population, 10,000.

**Owl.** The Owl Family includes about 200 species of birds of prey. Owls

are characterized by having round, flat faces, with eyes directed forward and surrounded by a ruff of feathers. Several species also have tufts of feathers on the head, resembling ears or horns, and from this peculiarity the long-eared owl and the great horned owl take their name. Most owls fly by night and spend the day in sleep in some secluded and deeply shaded place, such as the top of an evergreen tree in a dense wood. The plumage is abundant and remarkably soft, rendering the owl's flight noiseless.

Owls feed upon mice, squirrels, and other Rodents, upon small birds, and, to a limited extent, upon insects. They destroy many farm pests and should be considered by the farmer as a friend instead of an enemy, as is too often the case. The color is usually some shade of brown, mottled with darker shades of the same color. The snowy owl, an inhabitant of the Arctic regions, is white with brownish markings. In winter this owl is quite common in the northern New England States. Owls build their nests in old trees, and in holes in trees, and the eggs are always white. They vary in number with the species.

The little screech owl, about ten inches long, and the barn owl, a little larger, are the two species best known. The call is a peculiar hoot or whoop. When uttered suddenly in the stillness of the night, it is often startling, and superstitious people regard the owl as a bird of evil omen.

**Owos'so, Mich.,** a city of Shiawassee Co., 28 m. n.e. of Lansing and about 80 m. n.w. of Detroit, on the Shiawassee River and on the Grand Trunk, the Michigan Central, the Ann Arbor and other railroads. It is situated in a district containing deposits of coal, and is engaged in manufacturing. The manufactured products include door and window screens, dining-room tables and other furniture, carriages, spokes, hickory handles, snow shovels, caskets, knit goods, rugs, butter and breakfast foods. There are car and machine shops, meat-packing establishments and a beet-sugar factory. The beet-sugar industry is extensive. Owosso was settled in 1836 and was chartered in 1859. Population in 1910, 9639.

**Oxal'ic Acid,** an acid containing carbon, which is found in the oxalis plant, from the juice of which it was first obtained. It is found united with calcium in many other plants and in some animal tissues and organs. It is generally prepared by treating fats or sugars with nitric acid to induce them to take up more oxygen. Oxalic acid is a white crystallizable powder, used frequently as a bleach but not extremely well adapted to that purpose, as, unless it is much diluted, it injures the fabric which is being treated. It is also used in medicine.

**Oxenstierna,** *Ok' sen stern" a,* or **Oxenstjerna, Axel** (1583-1654), a Swedish statesman, born in Upland. He studied at the University of Wittenberg, devoting much attention to theology. In 1603 he entered the service of Charles IX of Sweden, displaying such marked qualities of statesmanship that he was appointed head of the regency when Charles became incapable of performing his duties. In 1611, on the accession of Gustavus Adolphus, Oxenstierna became chancellor. In this capacity he arranged the Peace of Stolbova with Russia in 1617, and four years later administered affairs at home while the King was carrying on the Polish war. Oxenstierna rendered effective assistance to Gustavus Adolphus in the Thirty Years' War, and managed the Swedish part of the struggle after the King's death at Lützen, besides directing the policy of the Protestants in Germany until the Peace of Westphalia in 1648. In 1645 he represented Sweden at the Peace of Brömsebro with Denmark. Shortly before his death he unsuccessfully opposed the abdication of Queen Christina.

**Ox'ford,** the principal city and the county seat of Oxfordshire, England. It is located at the confluence of the Thames (Isis) and Cherwell rivers, 52 m. by rail n.w. of London. The city is very old, and has derived its name probably from the popular etymology, used on its coat of arms—Oxenford, or an ox crossing

the river; or connects with Ousenford—a ford crossing the River Ouse. Its chief significance now is due to the fact of its being the seat of Oxford University. These buildings add beauty to the city, despite the surrounding marshes formed by the River Thames. Other buildings of importance are St. Martin Carfax, the old city church, St. Peter's Church, the new municipal buildings and His Majesty's Prison. It was a city of prominence in King Alfred's Day, and with its annexation to the West Saxon Kingdom in 912, it was first mentioned in the *Chronicle*. During the Reformation it was the scene of many struggles, and in the succeeding civil wars it was long a center for the Royalist party. Population in 1911, 53,049. See OXFORD, UNIVERSITY OF.

**Oxford Movement,** a movement on the part of a few young men of Oxford, who were later joined by numerous followers, to reclaim the Church of England from the lethargy into which it had fallen, and to restore to it the spirituality and symbolism that the Catholic Church of the Middle Ages had possessed. The movement was initially inspired by John Keble, in 1833, when he delivered at Oxford a sermon on national apostasy. In July of the same year a few friends met in Suffolk and there decided to begin the publication of a series of papers called *Tracts for the Times*. These Tracts, appearing from time to time, dealt with the polity, doctrine and worship of the Church. The leaders were soon known as Tractarians. Besides those clergymen already mentioned and among others, Edward B. Pusey and John Henry Newman gave their services to the cause. The Tractarian Movement ended in 1845, when Newman severed his allegiance with the English Church and united with the Roman Catholic. Under new leaders, however, the movement developed along broader lines. The results of the Oxford Movement may be summarized as follows: the restoration of order and dignity to public worship; the elevation of the standard of the clergy; the strengthening of the work among the poor; the giving of a new impetus to educational work; the strengthening of the hold of the Church upon the affections of the people.

**Oxford, University of,** at Oxford, England (1201). This, the oldest and most famous of English universities, is a federation of colleges, the development of bands of students who first gathered together in houses. The exact date of its founding is unknown, but the first public document in which it appears as a university bears the date of 1201. In 1249 a sum was given for the endowment of chairs and during this century three colleges were founded by separate gifts. Oxford now includes the following colleges for men: University, Balliol, Merton, Exeter, Oriel, Queen's, New, Lincoln, All Souls, Magdalen, Brasenose, Corpus Christi, Christ Church, Trinity, St. John's, Jesus, Wadham, Pembroke, Worcester, Hertford and Keble. Four colleges for women, Somerville, Lady Margaret Hall, St. Hugh's Hall, and St. Hilda's Hall, are maintained, but these do not grant degrees. Instruction at Oxford is given by lectures and private tutors, the recitation system common to American institutions not being employed. The curriculum includes nearly all branches of knowledge. All degrees of collegiate rank are conferred, the granting of degrees being based upon university examinations. Perfect freedom is allowed each student in the choice of subjects. A board of control manages affairs pertaining to the interests of the university as a whole, while each college is also supervised by an individual board. Oxford has an especial interest for Americans because of the gift of Cecil Rhodes, by which the university has become the Mecca of numerous scholarship students from the United States. See RHODES SCHOLARSHIPS.

**Oxygen, a** colorless gas discovered by Priestley in 1774, but given its present name by Lavoisier, who investigated its properties a little later. It is the most plentiful element on the earth, being a constituent of air, water and rock, and in combination with other elements being

found in all animals and plants. Oxygen is tasteless and odorless, about 1.1 times as heavy as air, and may be condensed into a light blue liquid if subjected to high pressure at a temperature of —119°. This liquid is strongly attracted by the magnet and has been frozen into a pale blue, snowlike solid.

Oxygen unites with almost all known elements, and the compounds formed by these unions are called oxides. The change that takes place is called oxidation and is illustrated by the rusting of iron, which is caused by the union of the metal with the oxygen of the air. Oxidation is ordinarily accompanied by the liberation of heat, but in the case of the rusting iron the process goes on so slowly that the heat set free is not usually perceived. If the process is more rapid the heat is liberated faster, as in the burning, or oxidation, of wood. Rapid oxidation is generally spoken of as combustion and ordinarily takes place only at increased temperatures (See COMBUSTION).

Oxidation is also a function of respiration, for the oxygen of the inhaled air passes through the lining of the lungs and is there taken up by the blood corpuscles, forming a bright red compound which gives the color to the blood in the arteries. In these corpuscles the oxygen is carried to all parts of the body, where it burns up the worn-out tissue (See RESPIRATION).

While oxygen is necessary to all but the most minute forms of animal life, it is too active to be breathed alone for a great length of time. In the air it is diluted by nitrogen, but when not so diluted it acts upon the tissues of the body too vigorously, and an animal confined in an atmosphere of oxygen could survive but a short time. Undiluted oxygen is sometimes prescribed by physicians to patients who have difficulty in breathing, but it must be administered with great care. Oxygen is also a necessary factor in decay but here acts only in the presence of certain bacteria.

Oxygen is produced by many methods, chief among which are: the heating of red mercuric oxide, interesting historically since it was in this way that oxygen was discovered; the heating of potassium chlorate, usually mixed with manganese dioxide; the evaporation of liquid air; the separation of water into the two gases, hydrogen and oxygen, by electricity; and the method called *Brin's Process*, which is used commercially and owes its usefulness to the peculiar attribute of barium oxide, which if heated to 500° takes up oxygen, forming barium oxide; this upon further heating, preferably under reduced pressure, gives off oxygen and returns to barium oxide, after which the process may be repeated indefinitely. Oxygen can now be purchased in strong steel cylinders in which it has been stored under great pressure.

Oxygen is set free in nature by green plants, which in sunlight take up carbon dioxide and water to form starch and oxygen; the latter is given off to the air.

OZONE. This is a modified form of oxygen, having a strong odor and great activity in combining with other elements; it is produced when an electric spark is passed through air or oxygen and it may be detected by its odor about electrical machines in operation, on electric cars, or in the freshness of the air after an electric storm. Since three volumes of air yield two of ozone, it is supposed that ozone has three atoms to a molecule, while oxygen has but two. Ozone is similar to oxygen, but more active. When breathed in quantity, it attacks the membranes of the nose and throat, causing severe headaches.

Recently very satisfactory results have followed the use of ozone as a deodorizer and a disinfectant. The ozone is blown into the apartment, or the air is passed through tanks of ozone, and the air is thus rendered sweet and fresh. This ozonizing process has been successfully used in theaters and factories where the air quickly becomes contaminated. Ozone is used commercially with oxygen and in the place of pure oxygen. Given to athletes it is said to revive their energy, but has the same after effects as any stimulating drug. See ALLOPTROPY.

**Oyama,** *O' ya ma,* **Iwao,** PRINCE (1842- ), a Japanese military officer. In 1894 he was appointed commander of the second Japanese army; and as commander-in-chief of the Japanese troops during the Russo-Japanese War, he captured Port Arthur and the fortress of Wei-hai-wei. He was rewarded for these victories by the rank of marquis, and three years later he was created field marshal. He also received the title of Prince in 1907; the year before, the British Order of Merit had been conferred upon him.

**Oys'ter,** a family of bivalve Mollusks of great commercial importance. Members of the family differ greatly in size, but the structure is practically the same in all. They have soft bodies, which are attached to the shell by a stout muscle, known as the adductor, able to keep the two halves of the shell tightly closed. A fold of muscle, called the mantle, grows from each side of the body and completely lines the shell. The space between these folds constitutes the body cavity. Two huge folds of muscle conceal the mouth, and other flaps form the gill chambers. The hard, muscular portion is the foot, which the oyster can extrude, although the adult does not use it as a means of locomotion.

Oysters reproduce by eggs, and the young are free-swimming for a time; later they attach themselves to a rock or other submerged object, where they sometimes collect in such numbers that their growing shells become ill-shaped and crowded. When allowed to grow naturally, the shells are oval, somewhat enlarged at one end. Pearls are produced by the introduction of hard particles, around which the oyster secretes a constantly hardening substance (See PEARL).

Oyster fisheries are of importance chiefly as a food supply. Great natural beds, whose supply once seemed unlimited, were located in Long Island Sound, Chesapeake Bay, the coasts of the Carolinas and the Gulf of Mexico. Because of the lack of regulation in oyster fisheries, these beds began to show signs of failing until the matter was taken up by the United States Fish Commission, and through its influence, oyster farming and oyster culture are becoming well-regulated industries. In some places beds are given up entirely to the production of seed oysters; these are the young, free-swimming oysters, which have not yet found a permanent resting place. In this form they are sent to the oyster farms, which are marked off by buoys in such a manner that each farmer may know his own territory. To be successful, this marine farm must have a sandy bottom, so that the young oysters will not be smothered in the mud. Cultches, or objects to which the oysters may attach, such as clean shells and tiles, are deposited before the seed is planted. By careful dredging to keep the oysters from crowding, intelligent seeding and protection against oyster enemies, chiefly starfish, an oyster fisherman may build up a profitable industry whose product is never a drug on the market.

Oysters are sold in the shell, in bulk, and canned. Under modern conditions they are taken up by steam or hand dredges and are canned immediately. Under ordinary conditions oysters are practically free from infection, but typhoid germs are sometimes introduced when the oysters are placed in fresh water for the purpose of swelling them. The products of the oyster beds of the United States constitute about 30 per cent of the total value of the American fisheries, and from this viewpoint they are the most important branch of the industry. An interesting discussion of the oyster fisheries is found in James L. Kellogg's book entitled *Shell-Fish Industries.* See FISHERIES; STARFISH.

**Oyster Bay, N. Y.,** a town and popular resort of Nassau Co., 23 m. n.e. of New York City, on the northern coast of Long Island on a bay opening into Long Island Sound and on a branch of the Long Island Railroad. A line of steamboats also connects Oyster Bay with New York. The town has attractions of fine scenery, and facilities for bathing, boating and fishing. Oyster cultivation is

the principal industry. Within the limits of Oyster Bay are the villages of Glen Cove, Sea Cliff and Hicksville. Oyster Bay is the home of Ex-President Roosevelt. Population in 1910, 21,802.

**Oyster Catcher,** a bird of the Snipe and Plover Family. These birds are about 18 inches long; the upper parts are brownish-black, the under parts white, the head and neck glossy black and the wings have a white spot. The bill is rather long, flattened and chisel-shaped; the bill and eyes are red; the feet and legs are flesh color. These birds present an awkward appearance but can run swiftly; they are frequently seen walking along beaches in search of oysters and other Mollusks. The nest is a hollow scooped out in the sand of the shore, and in it the two spotted eggs are laid. The oyster catcher ranges from Virginia south to Brazil and Chile.

**Oyster Plant.** See SAL'SIFY.

**O'zark Mountains,** a range of low dome-shaped mountains extending across the southern part of Missouri and the northern part of Arkansas into Oklahoma. The general trend is from northeast to southwest. They range in altitude from 1500 to 2000 ft. Some of the peaks in Missouri contain extensive deposits of iron ore, and in Arkansas the slopes are heavily timbered. The Ouachita Mountains south of the Arkansas River are a part of the Ozark system.

**O'zone.** See OXYGEN.

# P

**PACIFIC,** *Pa sif' ik,* **OCEAN,** the expanse of water which lies between North and South America on the east and Asia and Australia on the west. The ocean was named by Magellan. It is the largest expanse of water on the globe, being larger than the combined areas of the four continents which form its boundaries, and occupying one-half of the water surface of the earth. It connects with several other bodies of water—the Atlantic at Cape Horn, the Arctic at Bering Strait, the Sea of Japan, the China Sea, the Yellow Sea and the Sea of Okhotsk; on the south it is continuous with the Antarctic Ocean. The ocean's floor is very irregular. It slopes gradually from the shores of Asia, but on the eastern side descends abruptly to a great depth. In its deepest parts soundings of 31,614 ft. have been made; the mean depth is 13,800 ft. The largest plateau of the Pacific lies southeast of New Guinea and includes the Solomon, Fiji, Tonga and Ellice islands. The depth between these islands is from 1000 to 2000 fathoms. From other plateaus rise the Caroline Islands, the Low Archipelago, Hawaii and the Marshall and Gilbert groups.

The drainage into the Pacific is much less than that into the Atlantic, and the currents are less marked than those of the latter. In general, the direction of the currents follows that of the prevailing winds (See TRADE WINDS). The surface movement of the Northern Pacific constitutes a great eddy revolving in a north-east-south-west direction (See KURO SIWO); while in the Southern Pacific the current describes a circle in the opposite direction, though the movement is less well defined, owing to absence of land boundaries. The Pacific tides never attain the maximum heights reached in the Atlantic or even in the Indian Ocean; and the trade winds are more irregular than those of the Atlantic. Terrible hurricanes, called typhoons, frequently occur in the Chinese seas, and are likely to rage at any season of the year (See TYPHOON). The first European to reach the Pacific, according to recorded history, was Balboa, who, in 1513, sighted its waters from a peak on the Isthmus of Darien.

**Paddy Bird.** See JAVA SPARROW.

**Paderewski,** *Pa" de ref' skee,* **Ignace Jan** (1860- ), a Polish pianist and composer, born in Podolia, Russia. When a mere child he showed remarkable fondness for music and began giving recitals when only eight years of age. At 18 he was a professor in the Warsaw Conservatory, where he had previously studied. In 1884 he went to the conservatory at Strassburg, and in 1887 made his formal début in Vienna. He at once was placed in the first rank among the great pianists, and until 1905, when his health failed, he appeared repeatedly in the large cities of Europe and America. His playing was characterized by individuality, vivid appreciation of the composition and wonderful technique and pedal execution. Critics consider him the greatest pianist of his time. His compositions are almost entirely for the piano, but in 1900 he produced the grand opera *Manru,* which in 1902 he personally conducted in the United States. Among his other compositions are *Prélude and Minuet, Elégie* and *Danses polonaises.*

**Pad'ua,** a city of Italy, capital of the Province of Padua, is situated on the Bacchiglione River, 22 m. s.w. of Venice, with which it is connected by rail. The city has a triangular form and is surrounded by walls and ditches. The chief object of interest is the Piazza Vittorio Emanuele, an extensive promenade beautified with numerous statues, and the Cathedral, which dates from 1500. The

buildings of the university, the municipal art gallery and many private residences are also of interest. The industries include the manufacture of cloth and a few other commodities and are not important. The university, which dates from the 13th century, was formerly one of the largest and most distinguished in Europe. Its attendance is now about 1500, and the library has about 140,000 volumes. Ancient Padua was the most important town of Venetia. In 1405 it became a port of Italy. Population, about 82,000.

**Paducah,** *Pa du' kah,* **Ky.,** a city and county seat of McCracken Co., about 50 m. n.e. of Cairo, Ill., at the confluence of the Ohio and Tennessee rivers, 37 m. from the Mississippi River, and on the Illinois Central, the Nashville, Chattanooga & St. Louis and other railroads. The new railway bridge across the Ohio gives direct rail connection through Paducah with the South, and with the Gulf and Atlantic coast terminals leading to the Panama Canal. Paducah has one of the best deep-water harbors of any inland city in the country and has access to over 4000 m. of navigable rivers. Over 800,000 tons of freight are handled annually by the river interests. The wholesale business here surpasses that of any other city in the state except Louisville, and Paducah is the largest retail market of west Kentucky. The government has begun improvements in and around the city which will involve the expenditure of $20,000,000. The municipality maintains public parks, and there are hospitals and a fine United States Government Building. Paducah is built on a high elevation, and no levees are needed for the protection of the city against floods. It is situated in a rich agricultural region and within 25 to 40 m. of the great deposits of coal, iron ore, fluor spar, zinc, lead and pottery clays. The lumber and tobacco interests are extensive, and there is an important wholesale trade in live stock, groceries, vegetables, grain and hardware. Equally important are the manufactures, which include furniture and other lumber products, steamboats, cotton rope, flour, brick and foundry and machine-shop products.

Paducah, said to have been named in honor of an Indian chief, was laid out in 1827 and incorporated a year later. A city charter was granted in 1856. In 1861 it was fortified by General Grant, and, three years later, while occupied by a garrison of 800 Federals under Hicks, it was unsuccessfully attacked by a force of 5000 Confederates under Forrest. Population in 1910, 22,760.

**Paganini,** *Pah" gah ne' ne,* **Nicolò** (1782-1840), an Italian virtuoso, born at Genoa. His first lessons were given by his father, and he received additional instruction with the chapelmaster of the Cathedral of San Lorenzo. After making a successful public appearance in Genoa at the age of nine, he journeyed to Parma for the purpose of studying with Alessandro Rolla; but that teacher declared that the pupil had gone as far as the master. Paganini returned to Genoa and practiced prodigiously, attaining a marvelous technique. He played in London, and made many tours of Europe, acquiring a fortune, much of which, however, he afterwards lost in speculation. In 1827 the Pope decorated him with the Order of the Golden Spur. Everywhere his playing brought tremendous crowds, drawn as much by the fantastic personality of the man and by the curious tales circulated about him as by his unparalleled skill. He was the first to develop a bewilderingly intricate technique of the violin and as such he was epoch-making. Many of his compositions were of such difficulty that only he could execute them. There have been greater artists than Paganini, but few if any have equaled his dexterous performances.

**Page,** *Paje,* **David Perkins** (1810-1848), an American educator, born at Epping, N. H. He spent two years at Hampton Academy preparing for teaching; taught in the country schools of New Hampshire, and as associate principal of the Newburyport High School; and in 1845 was chosen principal of the Albany (N. Y.) State Normal School,

the first institution of its kind west of New England. He brought this school to a high standard; but exhausted himself in securing success, and died suddenly after a service of only four years. He was noted for his lectures on teaching. Page's *Theory and Practice of Teaching* was the first work of its kind prepared in this country, and is still extensively used.

**Page, Thomas Nelson** (1853- ), an American novelist, born in Virginia. He was educated at Washington and Lee University and at the law school of the University of Virginia. The publication of his short story, *Marse Chan,* in 1884, was the beginning of his literary career. His stories present a faithful and interesting picture of Southern life, and are widely popular. *In Ole Virginia* is a collection of stories in negro dialect. Other writings are *Two Little Confederates, Polly, Social Life in Old Virginia, Red Rock, Gordon Keith* and *John Marvel, Assistant. The New South* is a volume of essays. In 1913 he was appointed United States ambassador to Italy.

**Page, William** (1811-1885), an American portrait painter, born in Albany, N. Y. He studied at the National Academy of Design, and in Europe, where he lived from 1849 to 1860. From 1871-1873 he was president of the National Academy of Design. Among his chief works are *Farragut at the Battle of Mobile,* the property of the Czar of Russia; *The Holy Family,* in the Boston Athenæum; and *The Young Merchants,* in the Pennsylvania Academy of the Fine Arts.

**Pago'da,** a tower of many stories and ordinarily having the stories separated by projecting, verandalike roofs. Pagodas are common in India, China, Farther India and Japan, where they are either single structures or are parts of temples or memorials. The finest pagodas are the pyramidlike stone towers of India; those of China are often merely of rough brick.

**Pain.** See TOUCH.

**Paine,** *Pane,* **Robert Treat** (1731-1814), an American lawyer, a signer of the Declaration of Independence, born in Boston, Mass. He graduated from Harvard, taught school, visited Europe and studied theology and law, practicing his profession of law for many years. He was prosecuting attorney in the case of Captain Preston after the Boston Massacre. Having been delegated to the provincial and Continental congresses, he was attorney-general of Massachusetts and associate justice of that state's Supreme Court after the Revolution.

**Paine, Thomas** (1737-1809), a political and philosophical writer, born in Thetford, England. He was the son of a Quaker, and his schooling ended at the age of 13, when he entered his father's shop and learned the trade of a stay maker. Later he went to London, where he was for some time connected with the excise service. On the suggestion of Benjamin Franklin, who had seen some of Paine's essays, he came to the United States in 1774, and within a year he became editor of the *Pennsylvania Magazine.* He championed the cause of the colonists, which he set forth in a pamphlet entitled *Common Sense.* This pamphlet was probably Paine's greatest work, and it brought him into prominence at home and abroad. So great was its influence that the Pennsylvania Legislature voted him £500, and the Pennsylvania University conferred upon him the degree of M. A. Later the pamphlet was translated into several European languages. His *Crisis* was issued at irregular intervals during the Revolutionary War and exerted great influence in favor of the American cause. Paine served for a short time on the staff of Gen. Nathanael Greene, then became clerk of the Pennsylvania Legislature. In 1781 he was associated with Colonel Laurens in obtaining loans from France and Holland. His services during the war were highly appreciated, and after peace was declared Congress voted him $3000, and the State of New York gave him a large farm in Westchester County.

Paine again went to Europe, reaching France during the Revolution. Here he published a pamphlet under an assumed

name, advocating the abolition of royalty. While in England he published the *Rights of Man,* for which he was outlawed. He fled to France, where he was welcomed as a hero and elected to the National Convention. He soon incurred the displeasure of Robespierre and was thrown into prison, where he spent nearly a year. It was while in prison that he wrote most of his *Age of Reason,* in which he attacked the religious beliefs and systems of his day, and thus brought upon him the censure of Churchmen in Europe and America. This work also alienated some of his friends. Six years later he returned to the United States.

Paine was one of the most widely known men of his day. He was brilliant but erratic, and his irregularities occasionally brought distress upon him and embittered his spirit. He has often been considered an atheist, but he was not, though he did not accept the tenets of the Church. Notwithstanding his faults, the magnitude of his services to the United States can scarcely be estimated.

**Paint,** a substance used for coating materials for the purpose of preserving them from the weather, or for decoration. Paints contain a coloring matter called the pigment and a liquid called the vehicle. To these a solvent is sometimes added for the purpose of thinning the paint, and a drier to make the coating harden more quickly. White lead or zinc white, or both, mixed with boiled linseed oil, form the basis of oil paints. To this base any coloring matter desired may be added. Paints for the outside of buildings and other structures exposed to the weather should contain a large proportion of white lead, for otherwise they are not durable. Water-color paints are those in which the vehicle is water, and when used for decorating walls they are usually sized with glue. Most oil paints now in use are prepared in large manufactories and put up ready for use in tin cans, kegs and barrels. Water colors are usually sold in the dry state in packages, and are prepared for use by adding the necessary quantity of water. See PIGMENTS.

**Paint'ing,** in ordinary usage, a work of fine art in color. The process involves drawing and the laying of color upon a surface to which it is made to adhere by mixing it with some liquid or semiliquid medium. The various mediums employed have given name to the different kinds of painting. *Pastel* is a variety of painting in dry chalk, but this is usually designated as pastel rather than painting. *Fresco* is wall decoration done on wet plaster, the colors being mixed with water and powdered lime; the color sinks into the damp stucco or plaster and becomes a part of it, so that the painting lasts as long as the material containing it. Most of the wall painting of ancient Egypt and down to the 16th century was executed upon this foundation. The work not done in fresco but upon wood or stone was generally protected by some such glaze as varnish, which penetrated the pigment and so preserved it. In *encaustic painting,* employed in medieval times, the color was burnt into the ground surface by means of hot wax. In *tempera,* or *distemper,* used extensively in the later Middle Ages and still employed in scene painting or wall decoration, the pigments are mixed, or tempered, with an emulsion of egg yolk, white of egg or liquid glue, and vinegar. In the 15th century *oil painting* was introduced, and canvas became the surface material, used almost to the exclusion of every other. *Water color painting* refers to any process in which the colors are mixed with water and some adhesive material, as gum, instead of oil; but, at present, the term refers especially to painting done with such materials upon a paper which shows through as a ground work.

The art of painting is one of the most difficult for the layman to appreciate. The painter must draw objects, not as they are, but so as to present an illusion that they exist, and must employ color and light, not as they appear in nature, but in such a way that they will *seem* like nature. This rendering of an appearance of reality is, however, only a small part of the work. The noblest

works of art are those in which reality is reinforced by rhythm of line, purity of color and balance of parts, in which the complete work constitutes, as in poetry or other work of art, a harmonious whole —interesting in content and in ingenuity of execution. It is for the content of a picture, the thing represented, that the person uneducated in art is apt to care most. If a picture depicts with realism a familiar historical incident, he will admire the picture because the story is told in an intelligible manner. In this kind of a picture such representation is important; but it is not the end of art. The aim of painting is to utilize any object or combination of lines and colors in the production of a pattern which appeals to the eye. The objects employed to this end may be heroes or despicable cowards, saints or sinners; if they can be used to fill a given space agreeably and form the basis of beautiful masses of color and of light and dark they are fit subjects for the artist. Most paintings contain both the descriptive and pictorial elements, but one or the other usually predominates; thus it follows that all painting is divided into two distinct groups—that which is illustration and that which is decoration. In illustration, the emphasis is directed toward telling a story; in decoration, the primary purpose is to treat a surface in such a way that it will delight the eye.

## History of Painting

Early Period. *Egypt.* Here the first painting was on the walls of sepulchres and commemorated the deeds of the deceased; the figure on the mummy case was supposed to bear a likeness to the body it contained and was, therefore, a form of crude portraiture. At a later period this symbolic illustration also appeared on the walls of public buildings, and stories of the lives of the kings and the pursuits of the people were set forth. More often the scenes were mythological. The figures were often first indicated in raised or low relief, and then the color was laid on in flat tones without shade or gradation. Ideas were conveyed largely through symbol; a single tree indicated a forest; and a few stalks of grain, an entire field; the human figure was always drawn with the body facing the spectator, while the face and legs were in profile; the eye was shown on the side of the face, but drawn as it naturally appears in full view. These same peculiarities appeared for thousands of years, and artists seem not to have made the slightest effort to give a more realistic imitation of nature; if the thing was sufficiently lifelike to be recognized, it was adequate.

*Babylonia and Assyria.* The painting that remains from these countries closely resembles that of Egypt, although it shows a marked advance in representation of form. Great skill was shown in drawing, and the subjects were mythological and historic. Animals were especially well drawn.

*Greece.* Painting in Greece never reached the high point of perfection enjoyed by the sister arts of sculpture and architecture; its highest development came in the fifth and fourth centuries B. C. Few of the works of these early artists remain, and the most are known through contemporaneous writers. Parrhasius, Zeuxis, Polygnotus and Apelles are among those whose names have come down to us. Like sculpture, painting was in the service of the State and was employed in the decoration of public buildings. Nearly all statuary was painted, and on marble buildings, such as the Parthenon, sculpture and other architectural details were colored.

*Rome.* Roman painting was in many respects a reflection of that of Greece, but it developed an individuality, as is seen in the scant remains of fresco decorations in Etruria and Pompeii; these are Greek in form and subject, but Western in spirit.

Medieval Period. Painting, like sculpture, in the medieval period was an adjunct of architecture, and its purpose was to supply both decoration and illustration. With the decline of the empire and the rise of Christianity, it became devoted to the service of the Church, and under this domination it remained for more

than ten centuries, there accomplishing its most brilliant achievements. At first its purpose was purely utilitarian—to teach the Bible to those who could not read. Church interiors were covered with Scriptural scenes, executed in a manner which well illustrates the Christian reaction against the Greek view of life with its love of beauty. Early Christian art is stiff and lifeless, and the figures are little more than symbols. This was superseded by the more ornate Byzantine art, which sprang from a mixture of Oriental and decadent Greek art; it originated in Byzantium (Constantinople) when that city became the seat of the Roman Empire and when Christianity was made the state religion. Byzantine art was also formless and stiff, but it was more elegant, decorative and rich in color than its predecessor. It influenced European art widely from the fifth to the fifteenth century, and still prevails in Greece, Turkey and parts of Russia. Its chief remains are floor and wall mosaics and illuminated manuscripts.

*Italy.* About the middle of the 13th century a number of painters working in different parts of Italy, stimulated by the awakening naturalism of Gothic sculpture, began to make more lifelike figures. The first of these painters to put movement into figures and life into faces was Cimabue. A study of European art from this time shows a gradual but steady growth from the first childlike efforts of these early artists through a multitude of workers, each adding his individual knowledge and observation of nature. Numerous styles, or "schools," arose which were either an imitation of the work of some one artist or the manifestation of local tendencies. The two leading schools of the 14th century were the Florentine and the Sienese; the former aimed to secure accurate representation of form; the latter, to express sentiment and emotion. The first great painter of the Florentine School was Giotto di Bondone. He had hundreds of imitators, but for fully a century no advance was made upon his work as a whole. See CIMABUE, GIOVANNI; GIOTTO DI BONDONE.



The Sienese School was founded by Duccio, the first medieval painter to arrange figures in realistic groups expressive of a dramatic situation. Its chief exponents were Simone Martini, who improved the figure and facial expression, and the brothers Lorenzetti.

EARLY RENAISSANCE. *Italy.* In the 15th century painting declined at Siena, but advanced in Florence, while important schools arose at Umbria, Venice and other cities of northern Italy. Florentine painting was carried on by Masaccio, who advanced the study of perspective; Fra Filippo Lippi, the first to individualize faces in sacred pictures; Botticelli, remarkable for linear grace and decorative charm; Verrocchio, known as a sculptor, and the teacher of Leonardo da Vinci.

The Umbrian School advanced a more highly emotional type of art; it is chiefly represented by Signorelli, who made striking use of the human figure and was, in this respect, the forerunner of Michelangelo; and Perugino, the teacher of Raphael. Painting at Padua culminated in Mantegna, a master of a dignified vigorous style which powerfully influenced the art of Venice. The Venetian School, distinguished by harmonious use of color, was founded in the latter half of the 15th century by the Bellini family. Giovanni Bellini was the first exceptionally noteworthy painter of that city. Schools also arose in Lombardy, Bologna and Ferrara, but produced few men of pronounced genius. See MASACCIO; LIPPI, FRA FILIPPO; BOTTICELLI, SANDRO; VERROCCHIO, ANDREA DEL; SIGNORELLI, LUCA; PERUGINO, PIETRO; MANTEGNA, ANDREA; BELLINI, JACOPO; BELLINI, GIOVANNI.

*Netherlands.* In the latter part of the 14th century several schools of painting arose north of the Alps. A high development was reached in Flanders in the work of the brothers, Hubert and Jan van Eyck, who first made use of the background as an aid to the sentiment of the picture. Another great master was Hans Memling. See EYCK, VAN, HUBERT AND JAN; MEMLING, HANS.

HIGH RENAISSANCE. *Italy.* The highest development of Italian painting was reached in the first half of the 16th century and chiefly through the Florentine and the Venetian schools. The former had continued steadily to advance and was distinguished from the first for its perfection of form. The two great Florentine masters of this time were Leonardo da Vinci, the foremost scientist of his time and an artist whose paintings show perfection of form, with the added charm of spiritual significance; and Michelangelo, great as a painter and sculptor, a good draughtsman and a creative genius. Raphael, the leading painter of the Roman School, produced works that combined all the best elements of the art of his time. The greatest master of northern Italy outside of Venice was Correggio, the chief exponent of the nature worship of the Renaissance. The Venetian School, famous for its colorists, produced Giorgione, whose work subordinates detail to beauty of line and color; Titian, the greatest colorist that ever lived; and Tintoretto, who sought to combine the color of Titian with the vehemence of Michelangelo. After these masters came many mediocre imitators and a period of decline ensued. Later a reaction against this imitative tendency was started at Bologna by a family of artists named Caracci. See VINCI, LEONARDO DA; MICHELANGELO BUONARROTI; RAPHAEL SANZIO; CORREGGIO; GIORGIONE DA CASTELFRANCO; TITIAN; TINTORETTO, IL; CARACCI.

GERMANY, HOLLAND AND FLANDERS. Meanwhile the Renaissance began to flower in the North. The first great German master was Albrecht Dürer of Nuremberg, the most original and imaginative genius of his country. Foremost, however, is Hans Holbein, the younger, remarkable for his realism. Flemish painting in this century is represented by Quintin Matsys, who drew life-size figures; and the Dutch by Lucas van Leyden. See DÜRER, ALBRECHT; HOLBEIN, HANS.

THE 17TH AND 18TH CENTURIES. Although some of the world's masters of painting belong to the 16th century, the two following centuries were remarkable for the large number of artists and the masterpieces produced. The leading school of this period was the Dutch, and the first of the painters in point of time was Frans Hals, an unrivaled portraitist. His contemporary, Rembrandt, was the greatest painter Holland ever had, a wonderful master of light and shade. The Dutch excelled as painters of scenes of everyday life, and they treated still-life delightfully. Ruysdael and Hobbema were among the leading landscapists, but so numerous and so gifted are the painters of this school that it is not possible even to enumerate them. The Flemish School, led by Rubens, was influenced by Italian art and showed great beauty of line and color. Rubens excelled in depicting richly-colored pageants of life; his pupil Van Dyck was a remarkable portrait painter. Among the Flemish painters of the 17th century was Teniers, who painted delightful scenes of everyday life. In Spain the influence of the Italian naturalists was conspicuous in Velásquez, by far the chief artist that Spain has produced and one of the few great geniuses of all time, and again in the work of Murillo, which is unsurpassed in its expression of religious ecstasy.

In France the "heroic landscape" found its chief exponents in Poussin and Claude Lorrain, both of whom did most of their work in Italy. Madame Lebrun was the chief figure painter of the period. The great triad of English artists of the 18th century were: Hogarth, a remarkable satirist; Reynolds, who established academic methods in England; and Gainsborough, a great portraitist and figure painter. See HALS, FRANS; REMBRANDT; RUYSDAEL, JACOB; HOBBEMA, MEINDERT; RUBENS, PETER PAUL; VAN DYCK, SIR ANTHONY; TENIERS, DAVID; VELÁSQUEZ, DIEGO RODRIGUEZ; MURILLO, BARTOLOMÉ ESTEBAN; POUSSIN, NICOLAS; CLAUDE LORRAIN; LEBRUN, MARIE LOUISE; HOGARTH, WILLIAM; REYNOLDS, SIR JOSHUA; GAINSBOROUGH, SIR THOMAS.

The 19th Century. France was the chief source of art inspiration of the 19th century. The first of the important movements originating there was the classical revival, instituted by David. A revolt against the classical tendency occurred about 1830, contemporaneously with the reaction against Classicism in literature; it is known as the Romantic movement, and was led in painting by Delacroix. The Barbizon School represented that branch of Romanticists that found expression in the poetic treatment of landscape. Leaders of this school were Corot, Rousseau, Daubigny, Cazin and Millet. After this sprang the great school of Impressionists, organized in 1874 and led by Claude Monet. This school exercised and continues to exercise a very great influence upon painting in England, Germany and the United States. Its aim is to fix upon canvas a fleeting impression of a momentary aspect of nature, to render effects of light and to catch and convey the impression of life and movement. The work of the Impressionists was done chiefly out of doors. See David, Jacques Louis; Delacroix, Ferdinand Victor Eugène; Corot, Jean Baptiste Camille; Daubigny, Charles François; Millet, Jean François; Monet, Claude.

In Germany the revolt against Classicism was inaugurated in 1815 under the leadership of Overbeck. Associated with him in the movement were Cornelius, Kaulbach, Schadow and Lessing. The return to realism came in 1870, and among the leaders was Menzel, a great historical painter. Great Britain did not come under French influence until very recently. In the beginning of the century there appeared the historical painters Etty, Haydon and Eastlake; the mystical genius, William Blake; painters of everyday life, as Wilkie, Mulready and Frith; and Constable and Turner, painters of landscapes. See Cornelius, Peter von; Kaulbach, Wilhelm von; Blake, William; Turner, Joseph; Constable, John.

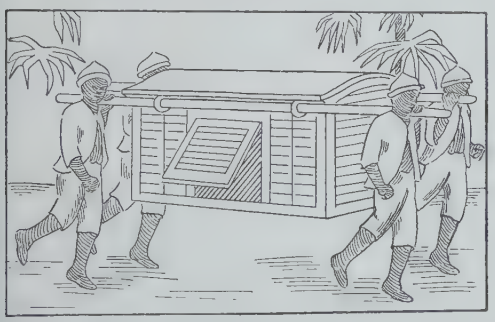
About the middle of the century, a small brotherhood of artists, displeased with the cut and dried academic tendencies of art, inaugurated a movement which should derive its inspiration from painters before the time of Raphael. This school is known as the Pre-Raphaelites, and among its leaders were Rossetti, Holman Hunt, Burne-Jones, Millais and Brown. Other prominent artists of this period were Leighton, Walter Crane and Herkomer. In other parts of Europe no influential schools have been established. Munkácsy in Hungary, Fortuny, Sorollo and Zuloaga in Spain, and Vereshtchagin in Russia are the prominent names.

The United States, in the early part of the 19th century, claimed such artists as Copley, West, Trumbull, Stuart and Vanderlyn, though many of these were British. In the second period appeared Durand and Church and their contemporaries, Henry Inman, William Page, Daniel Huntington, W. M. Hunt and Thomas Hicks, who were strongly influenced by the French. Among the foremost painters at the beginning of the 20th century were John La Farge, Elihu Vedder, Edwin Blashfield, W. M. Chase, and Winslow Homer. Among the great landscapists are Inness and Homer Martin. Some of the greatest Americans have done their work abroad; such are James McNeill Whistler, E. A. Abbey and J. S. Sargent. The foregoing are only a few of the leading names in the history of American painting, which at present is represented by a large school individual in its tendencies and in its choice of subjects. See Rossetti, Dante Gabriel; Hunt, William Holman; Burne-Jones, Sir Edward; Millais, Sir John Everett; Leighton, Sir Frederick; Crane, Walter; Herkomer, Sir Hubert von; Copley, John Singleton; West, Benjamin; Trumbull, John; Page, William; Vedder, Elihu; Blashfield, Edwin Howland; Chase, William Merritt; La Farge, John; Homer, Winslow; Inness, George; Martin, Homer Dodge; Abbey, Edwin Austin; Whistler, James Abbott McNeill; Sargent, John Singer.

**Paintings, The Twelve Great.** According to competent art critics the

twelve greatest paintings in the world are as follows: *Last Supper,* Da Vinci, 1498, Santa Maria delle Grazie, Milan; *Assumption of the Virgin,* Titian, 1518, Venetian Academy; *Immaculate Conception,* Murillo, 1678, Louvre; *Beatrice Cenci,* Guido Reni, 1509, Barberini Palace; *The Night,* Correggio, 1522, Dresden Gallery; *Aurora,* Guido Reni, 1609, Rospigliosi Palace, Rome; *Descent from the Cross,* Volterra, about 1545, Church of S. S. Trinita de' Monti, Rome; *Descent from the Cross,* Rubens, 1612, Antwerp Cathedral; *Communion of St. Jerome,* Domenichino, 1614, Vatican; *Last Judgment,* Michelangelo, 1534-1541, Sistine Chapel; *Sistine Madonna,* Raphael, 1518, Dresden Gallery; *Transfiguration,* Raphael, 1519, Vatican.

**Pakenham,** *Pak' en am,* **Sir Edward Michael** (1778-1815), a British soldier, born in Ireland. He was brother-in-law to the Duke of Wellington, under whom



PALANQUIN

he won great fame for gallantry and ability as a leader in the Peninsular War. During the War of 1812, then a major-general, he commanded the British fleet of 50 vessels which bore 20,000 veterans and 1000 heavy guns to the Gulf of Mexico, with New Orleans as an object. The fleet arrived at the entrance to Lake Borgne on Dec. 10, 1814. On Jan. 8, 1815, a battle was fought at New Orleans, where Pakenham was killed, two horses being shot beneath him. See NEW ORLEANS, BATTLE OF.

**Palanquin,** *Pal" an kwin',* or **Pal"an-keen',** a conveyance in the form of a covered box, provided with latticed shutters and fastened to two long poles, by which it is borne on the shoulders of men. It was formerly much used in India, China and other Eastern countries as a means of travel, but since the introduction of railways and the improvements in roads, other methods of transportation have been found more desirable.

**Palate,** *Pal' at,* a name applied to the roof of the mouth. It consists of two parts, the hard and the soft palate. The hard palate is situated well to the front and rests upon the bone separating the mouth and the nasal cavities. It serves as a support for the tongue in eating and speaking. Behind it and continuous with it is the soft palate, which is composed of muscles and membranes and ends in a movable arch over the back of the mouth in front of the throat. Along the edge of the arch and parallel with it are two folds of membrane, called pillars. In the middle of its arch the palate makes a dip in the shape of an imperfect V, about a half inch in length, forming the uvula. This can easily be seen by means of a mirror. Its special use is not definitely known. It is subject to enlargement and irritation and is often a cause of coughs. On each side between the pillars or arches is a long, narrow, troughlike depression. These hollows are called fauces. The tonsils are two glandular bodies, each about the size of an almond, which are situated at the lower ends of the fauces just above the pharynx. The soft palate contains numerous glands which secrete the mucus which lubricates the throat during the passage of food. Besides playing an important part in the swallowing process, it aids in the production of certain sounds. See PHARYNX; TONGUE.

**Palat'inate,** the name of two small countries in the old German Empire. These were known as the Upper Palatinate and the Lower, or Rhenish, Palatinate. The former is now included within the Bavarian district of the Upper Palatinate and Regensburg, with Amberg the capital. The latter was composed of an irregular strip of territory lying on

both sides of the Rhine, and in 1214 it was acquired by the House of Wittelsbach in the person of Louis I, Duke of Bavaria. Early in the 14th century a part of Bavaria between the Danube and the Fichtelgebirge was given by the Emperor Louis to his kinsmen ruling in the Rhenish Palatinate, and thus originated the Upper Palatinate.

In 1356 Emperor Charles IV designated the Count Palatine of the Rhine as one of the seven imperial electors. Rupert III occupied the throne of Germany from 1400 to 1410. During the Reformation the electors favored the Protestant cause. While the Thirty Years' War was in progress the Elector Frederick V was defeated at White Hill and deprived of his lands, and the electoral dignity was conferred on Maximilian I, Duke of Bavaria, who in 1628 was formally invested with the Upper Palatinate. By the Treaty of Westphalia (1648) the son of Frederick V regained the Lower Palatinate, while the Upper Palatinate remained a part of Bavaria. During the Napoleonic wars that part of the Palatinate on the left side of the River Rhine was ceded to France, while the territories on the right bank were divided among Baden, Hesse-Darmstadt, Leiningen and Nassau. At the Congress of Vienna, France was deprived of that part beyond the Rhine, which was divided among Bavaria, Hesse-Darmstadt and Prussia.

The Rhenish Palatinate and the Upper Palatinate have an area respectively of 2289 and 3729 sq. m. Population of the former in 1910, 937,085; of the latter, 600,284.

**Paleontology,** *Pal" e on tol' o jy,* a science which treats of extinct forms of organic life. It includes the study of both plant and animal life, based upon fossil remains found embedded in the rocks. It has close affiliations with botany, anatomy and geology. A comparative study of the various fossil remains in connection with the rocks with which they are associated has led to a fairly accurate knowledge of the order of succession of the chief type forms, and has made possible a division of geologic time into periods and systems. Not all species of plant and animal life are represented in fossil deposits; but in spite of the numerous gaps, the wealth of detail furnished by these records constitutes a remarkable history, showing lines of descent of many races of animals and plants. See Fossils.

**Paler'mo,** a seaport of Sicily, capital of a province of the same name, situated on the northwest side of the island, on the Bay of Palermo. The prominent buildings are the royal palace, the university, a cathedral of the 12th century, the archbishop's palace, the custom-house and several medieval houses and towers. The new harbor has large docks and shipbuilding yards. The manufactures are chiefly glass, gloves and leather. The surrounding plains yield oranges and lemons, which constitute the principal exports. The fisheries of the island are significant. The city was probably founded by the Phœnicians. It became the capital of the Carthaginian dominions in Sicily, was captured by the Greeks, the Romans and the Normans, and the final deliverance from foreign rule was brought about by Garibaldi in 1860. Population in 1906, 323,747.

**Pal'estine,** or **The Holy Land,** the home of the Israelites, and the Land of Canaan, a part of Asiatic Turkey bordering on the Mediterranean Sea. Its length from north to south is about 150 m; its breadth from east to west varies from 35 to 110 m. Its area is approximately 10,000 sq. m., or about equal to that of New Hampshire. The southern and western boundaries are not definitely established, but the country is generally considered to extend as far south as the southern end of the Dead Sea. An important physical feature is a low plain, bordering the coast and extending inland from 5 to 20 m., where it merges into a highland region that gradually rises to an altitude of 1500 ft. Beyond this is a narrow plateau from 3000 to 5000 ft. in altitude and upon which the chief mountains are located. This plateau is divided by the great Plain of Esdraelon,

which extends to the Valley of the Jordan. In the section south of this plain are Gilboa, Gilead, Gerizim, Ebal and other mountain peaks, all widely known for their connection with Old and New Testament history. Rising from the plain itself is Mt. Tabor, supposed to be the scene of the Transfiguration, and on the point facing the south shore of the Bay of Acre is Mt. Carmel, where Elijah routed the prophets of Baal. The plateau north of the plain contains ranges of low hills and their mountain ranges, which are southern extensions of the Mountains of Lebanon.

The most striking physical feature of Palestine is the Valley of the Jordan, whose bed for nearly its entire length is below sea level. Rising north of Palestine, the Jordan flows through Lake Huleh (Merom) and the Sea of Galilee on its way to the Dead Sea, into which it empties. Owing to its windings, the entire length of the stream is about 200 m., though in a direct line the distance from its source to its mouth is less than 70 m. The valley has steep slopes on both sides, and the valley forms a serious obstruction to travel east and west. Beyond the Jordan Valley the country is a plateau, with an altitude of about 1500 ft.

Palestine has a mild climate, though the summer months may be oppressive, owing to the high degree of humidity of the atmosphere. The year is divided into two seasons: summer, extending from April to November; and winter, from November to April. The summer is the dry season. During the winter there is a considerable fall of rain, though the yearly average is only about 20 inches. Snow falls occasionally, but the ground seldom freezes.

Forests of oak and pine still exist, but, in general, the country is barren and desolate. In some places the olive, the walnut, the sycamore, the palm and oleander are found, and figs, olives, oranges and some cereals are raised. The soil is fertile, and with irrigation and proper cultivation will produce abundant crops.

Palestine is of world-wide interest only because of its connection with Biblical history. It was first known as the Land of Canaan, and previous to its occupation by the Israelites it was held by a number of independent tribes, of which the Philistines, who dwelt along the coast, were the farthest advanced in civilization and the most powerful. At the Israelitish invasion most of these tribes were conquered, though the Philistines were never permanently subdued. For more than 1000 years the country was the home of the Hebrew people. About 1050 B. C. the tribes were united under Saul, who was the first civil king of the Hebrew nation. Under David, Saul's successor, the surrounding country was conquered and the kingdom became firmly established, and during the reign of Solomon its fame spread to all surrounding nations. At Solomon's death the kingdom was divided, Israel occupying the northern portion and Judah the southern portion of the country. In 722 B. C. the Kingdom of Israel was overthrown by the Assyrians, and in 586 B. C. Judah was overthrown by the Baylonians. During the time of Christ, Palestine was held by the Romans, who divided it into four provinces, Galilee, Samaria, Judea and Peræa. In the seventh century it passed to the control of the Mohammedans, with whom it has remained, except for a short period during the Crusades (See CRUSADES).

Since 1880 educated Jews from various countries have been taking up their residence in Palestine. An agricultural experiment station has been established at Hafia, and scientific methods introduced. The result proves beyond doubt that the soil is as fertile as it ever was, and there is a fair prospect of this land's again sustaining a large population. Population, about 700,000.

**Palestine, Tex.**, a city and the county seat of Anderson Co., 150 m. n. of Houston, on the International & Great Northern, the Dallas, Corsicana, Palestine & Gulf and other railroads. The manufacturing establishments include cottongin works, cottonseed-oil mills, feed mills, grain elevators, brickworks and manufactories of crates and baskets,

office fixtures, show cases and cigars. The salt plant has an output of about 150 cars per month. The general shops of the International & Great Northern Railroad are located here, with a pay roll of $1,000,000 per year. The noteworthy buildings include wholesale houses, banks, churches, schools, and a Y. M. C. A. Building costing $60,000. A new courthouse to cost $150,000 is under negotiation. Anderson County took first prize in the state contest for the greatest yield of corn per acre in 1911, and first and second prize for greatest yield in 1912 without fertilization or irrigation. Palestine was settled in 1846 and incorporated under the general law of 1870. Population in 1910, 10,482.

**Palisades,** *Pal" i sadz',* a perpendicular cliff of basaltic rock, on the west bank of the Hudson River and extending northward for about 15 m. from Fort Lee, N. J. The cliff is from 350 ft. to 500 ft. in height, and in places the rocks have been broken into fantastic forms. Throughout their entire length the Palisades present a picturesque appearance, and they are considered one of the most remarkable cliffs in the world. They add much to the scenic beauty of the Hudson. See HUDSON RIVER.

**Palladio,** *Pahl lah' dyo,* **Andrea** (1518-1580), one of the greatest classical architects of the 16th century, born at Vicenza, Italy. After study of ancient monuments at Rome, he returned to his birthplace and became famous as a designer of many noble edifices, in which he manifested knowledge, skill and taste in adapting the style of Roman architecture to the needs of his time. His buildings are characterized by dignity and breadth of treatment and beauty of design. They include an arcade around the Basilica of Vicenza, the Barbarano and Chierigiti palaces, and his masterpiece, the Marcantonio Tiene Palace; the Rotonda Capra Villa and the Church of Il Redentore.

**Palla'dium,** a famous statue of Minerva, believed to have fallen from heaven into Troy, whose safety depended upon the possession of this talisman. During the Trojan War, Ulysses and Diomedes, disguised, carried the Palladium off to the camp of the Greeks. The Romans long claimed that this statue was preserved in their temple to Vesta. They were supposed to have received it from Æneas, who had received it from Diomedes.

**Palm,** *Pahm,* a name applied to a number of useful plants grouped together in the Palm Family. They are chiefly tropical plants, and, though mainly trees, are in some cases shrubby or even grasslike. The palm trees have slender, cylindrical stems, crowned by a graceful tuft of long, featherlike leaves; lower palms, such as those often seen in greenhouses, have leaves whose divisions spread like fingers from the palm, whence the family derives its name. The flowers are often inconspicuous, but the fruits are generally large and of commercial importance. The palm is one of the most useful plants, especially in its native regions, where it furnishes food, clothing, furniture, tools, dishes and other domestic necessities, as well as the material for the house itself. The tree palms are best known in the United States through their products. See COIR; COCONUT; DATE; DOUM PALM; IVORY PALM; PALMETTO.

**Palma,** *Pahl' mah,* **Jacopo** (about 1480-1528), a Venetian painter of the High Renaissance. He was called Palma Vecchio (Old Palma), to distinguish him from his grandnephew. He was a pupil of Giovanni Bellini and shows the influence of his master in his *Tobias and the Angel* (Stuttgart). Later he was influenced by Giorgione and Titian. Palma is one of the leading painters who take rank just below the great masters, such as Titian, Giorgione, Raphael, etc. As a colorist he was little beneath Titian, but he lacked the power and vigor in draughtsmanship which is a part of genius. In his best period Palma painted an altarpiece of St. Barbara in the Church of Santa Maria Formosa, Venice. The figure of the Saint is one of the most beautiful and majestic female figures in Venetian art. Other important works

are *The Adoration of the Shepherds* (Louvre), *The Madonna and Child Adored by Saints* and *Meeting of Jacob and Rachel.*

**Palma, Tomas Estrada** (about 1836-1908), a Cuban general and patriot, first president of Cuba, born in Cuba and educated at the University of Seville. He was active in the Cuban insurrection of 1868 and became president of the new republic, but was captured and carried to Spain. Subsequently he founded, and managed until 1895, a school in Orange County, New York. In 1895 he became plenipotentiary of the Cuban Republic, of which in 1901 and in 1906, he was elected president. Charges of fraud, however, brought on an insurrection. Palma resigned, and order was restored by intervention of the United States. See CUBA, THE REPUBLIC OF, subhead *History.*

**Palmer,** *Pahm' er,* **Alice Freeman** (1855-1902), an American educator, born at Colesville, N. Y. She graduated at the University of Michigan, taught at Lake Geneva, Wis., and was professor of history in Wellesley College for two years, becoming acting president of this institution in 1880, and two years later its president. In 1887 she resigned, and married George H. Palmer, a professor at Harvard. Later, she served for three years as nonresident dean of women of the University of Chicago, and was for a time a member of the Massachusetts State Board of Education. She frequently lectured upon educational and municipal problems. Mrs. Palmer received honorary degrees from several universities.

**Palmer, John McAuley** (1817-1900), an American statesman and soldier, born in Scott County, Ky. Admitted to the Illinois bar in 1839, he had been a Democratic senator and a Republican member of the electoral college by the outbreak of the Civil War, during which he served at New Madrid, Island No. 10, Murfreesboro, Chickamauga, Chattanooga and in the Atlanta campaign, and was promoted major-general of volunteers. He was a Republican governor of Illinois, 1869 to 1873, and a Democratic United States senator, 1891 to 1897. In 1896 he was presidential candidate of the Gold Democrats. He is the author of *Personal Recollections.*

**Palmer, Mass.,** a town of Hampden Co., on the Chicopee River, 15 m. n.e. of Springfield, and on the Boston & Albany division of the New York Central and Central Vermont railroads. The manufactures include carriages, straw goods, cotton and woolen goods, carpets and other articles. A good high school is maintained. The town includes the villages of Bondsville, Thorndike and Three Rivers. Population in 1910, 8610.

**Palmer, Ray** (1808-1887), an American clergyman and hymn writer, born in Rhode Island and educated at Yale. He was early a teacher, in 1835 was called to the pastorate of Central Congregational Church, Bath, Me., and in 1850 transferred to First Congregational Church, Albany, N. Y. In 1866 he gave up pastoral work to become secretary of the American Congregational Union, New York. Palmer is remembered chiefly as a hymn writer, his *My Faith Looks up to Thee* existing in 20 different languages. His writings include *Hymns and Sacred Pieces, Hymns of My Holy Hours* and *Voices of Hope and Gladness.*

**Palmetto,** *Pal met' o,* an unbranched tree of the Palm Family, found in tropical and subtropical countries. The trunks are stout and cylindrical and covered by a reddish bark; the leaves are divided into narrow, spreading divisions, resembling the palm of the hand in form. The flowers are inconspicuous and the fruit is a small black berry, with sweet, fleshy pulp. The palmetto is abundant throughout the West Indies, the Gulf States, Venezuela and Mexico. The trunks are valuable for dock piles, and cross sections are polished and used for making small stands; the branches produce canes; the fibers are used for making scrubbing brushes, hats, matting and baskets. The palmetto is also called the cabbage palm. It is the state emblem of South Carolina.

**Palm'istry,** or **Chiromancy,** *Ki' ro man" sy,* the art by which it is claimed the palm indicates the character and temperament of a person. Some profess to discover in the palm evidences by which they can describe past events as well as make predictions for the future. The theory is based upon the formation of the lines in the palm, as well as in the shape of the hand.

A prominent line in the palm is the line of life, a curve from the basal joint of the forefinger round the thumb as far as the wrist. When this is deeply colored and continuous, it is said to indicate a long and happy life. Good luck and fortune are shown by a clear and unbroken line from the forefinger to the little finger, called the line of fortune, while the line of health runs across the hand. The fleshy projection at the base of the forefinger is called the mount of Venus; at the base of the thumb, the mount of Jupiter; of the middle finger, the mount of Saturn; of the ring finger, the mount of the sun; and of the little finger, the mount of Mercury; and so on. When Jupiter is well developed, ambition and pride are indicated; Venus, melody and love; Saturn, fatality; the sun, riches; and Mercury, science and wit. Palmistry is not considered to be an exact science.

**Palm Oil,** a fatty material obtained from several species of palm, but chiefly from the fruit of the oil palm, which is native to the west coast of Africa. The oil is obtained from the fleshy covering of the fruit, and is a deep orange color when fresh, with an odor similar to that of violets. It is used by the natives as food, but is generally employed in making soap and candles and for lubricating machinery. See SOAP; CANDLE.

**Palm Sunday,** the last Sunday in Lent, so named because palm, boxwood or olive branches are blessed by the priests on that day and carried in procession. This ceremony honors Christ's triumphal entry into Jerusalem five days previous to the crucifixion.

**Pa'lo Al'to, Battle of,** the first important battle of the Mexican War, fought eight miles northeast of Brownsville, Tex., May 8, 1846, between 2300 Americans, under General Taylor, and 6000 Mexicans, under generals Arista and Ampudia. As Taylor was marching from Point Isabel to Ft. Brown, he met the enemy, and after a five hours' fight, mainly with the artillery, the Mexicans retreated to Resaca de la Palma. See MEXICAN WAR.

**Pal"pita'tion,** a term applied to abnormally forceful beatings of the heart. It may arise from sudden emotion, disturbance in a vital organ, or may be due to some organic disease of the heart. It is sometimes continuous, but more often comes on at irregular intervals after physical exertion or nervous excitement. Excessive coffee or tea drinking, tobacco or other stimulants may be an accessory cause or may aggravate the disturbance.

**Pamir,** *Pah meer',* **Plateau of.** See HINDU KUSH MOUNTAINS.

**Pamlico,** *Pam' li ko,* **Sound,** a sea lagoon on the southeastern coast of North Carolina, stretching 80 m. southward from Roanoke Island. Its average width is 20 m. Long and narrow sand bars separate it from the Atlantic Ocean, and marshes line its inner shores. The fisheries are extensive and large numbers of wild fowl haunt its waters.

**Pampas,** *Pam' paz,* a term used to designate some of the treeless plains of South America. It applies specifically to the vast tract in the region south of the forested areas of the Amazon basin, particularly that part which lies within the boundary of the Argentine Republic. The pampas embrace an area approximately 250,000 sq. m. The surface is slightly undulating and ranges in height above the sea level from 1300 ft. in the western portion to 100 ft. along the Atlantic coast. During the wet season the plains are covered with grasses and afford pasturage for sheep and cattle. A part of the region is suitable for agriculture.

**Pan,** Grecian god of shepherds and flocks, of woods and fields. The worship of Pan was introduced into Athens after the Battle of Marathon, and a sanctuary

in a cave on the northwest side of the Acropolis was given him. Various legends sprang up about him. One story is that he pursued the nymph Syrinx to the bank of a river. As he threw his arms about her he found he was embracing only a tuft of reeds. Breathing a sigh, he heard the air sound through the reeds, which produced a plaintive melody. The god then took some of the reeds and made an instrument which he called Syrinx. Pan frequently is represented as having a goat's legs and horns, a shaggy beard and hair and goatlike features. He is also depicted as a youthful shepherd with short horns.

**Panama,** *Pan" a mah',* **Canal,** a ship canal crossing the Isthmus of Panama from Colon on the coast of the Caribbean Sea to Panama on the Pacific. The length of the canal from deep water in the Caribbean to deep water in the Pacific is about 50 m. The distance from deep water in the Caribbean to Limon Bay is about 4½ m. and from deep water in the Pacific to the shore line is about 4 m.; therefore the length of the canal proper, or the channel in which excavations have been made, is approximately 41½ m. The width ranges from 300 to 1000 ft. on the surface and has a minimum width of 300 ft. at the bottom. The minimum depth is 41 ft.

In passing through the canal from the Atlantic to the Pacific, a vessel will enter the channel at Limon Bay at sea level and proceed for about 7 m. to the Gatun Locks. This channel is 500 ft. wide at the bottom. At the Gatun Locks the vessel is raised 85 ft. to the level of Gatun Lake. It will sail at full ocean speed through this lake in a channel varying from 1000 ft. to 500 ft. in width and 24 m. in length. At Bas Obispo it will enter the Culebra Cut, which extends to Pedro Miguel, a distance of 9 m. The channel through the cut is 300 ft. wide at the bottom. At the Pedro Miguel Lock the vessel will be lowered 30⅓ ft., where it will proceed to Miraflores, a distance of 1½ m. Through the Miraflores Locks it will be lowered 54⅔ ft. to the sea-level section extending to the Pacific. The time for passage will be from 10 to 12 hours.

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Preparatory Movements. The events directly related to the construction of the Panama Canal by the United States began in 1878, when Lieutenant Wyse of the French navy, acting for a French corporation, obtained from Colombia a concession for constructing a canal across the Isthmus of Panama. The next year the Panama Canal Company was organized, with Ferdinand de Lesseps, the builder of the Suez Canal, as president. This company proposed to construct a sea-level canal, having a depth of 29½ ft. and a width at the bottom of 72 ft. De Lesseps estimated the cost at $127,000,000 and the time required for completing the work at eight years. The location was the same as that of the present canal. Work was begun in 1881 and continued to 1887. During this time over $200,000,000 had been expended and only a small part of the work completed. Illegal methods were used for securing additional funds, and in 1889 the company was declared bankrupt and dissolved, and a liquidator was appointed to take charge of its affairs. The liquidator finally succeeded in 1894 in forming a new company with a capital of about $13,000,000, distributed over 650,000 shares of stock of 100 francs each; 50,000 shares were subscribed by the Government of Colombia. The concessions and assets of the old company were taken over by the new Panama Company. A commission consisting of engineers from Great Britain, France and the United States was appointed to examine the route selected and the work already done. This commission reported in favor of completing the canal, stating that two-fifths of the work was already done and that the expense of completing the canal should not exceed $102,500,000, and that the time required should not exceed ten years. Work was resumed on a small scale and continued until 1893, when operations were suspended because of lack of funds.

Meantime the United States Government had become actively interested in

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the project, and in 1899 Congress appointed an Isthmian Canal Commission. After a thorough examination of all practicable routes, the Commission reported at the close of 1900 favoring a canal through Nicaragua. Chiefly because of the concessions on Panama held by the French Company, this report finally led to the sale by the French Company of all its property and concessions in Panama to the United States for $40,000,000, Colombia agreeing to the transfer.

The United States immediately began negotiations with Colombia, and in January, 1903, a treaty providing for the cession to the United States of a Canal Zone in Panama was ratified by the United States Senate. However, in July the Colombian Senate refused to ratify the treaty. Following this failure the State of Panama seceded from Colombia and formed an independent government (See PANAMA, REPUBLIC OF). The new state was immediately recognized by the United States, and a treaty was negotiated, by which Panama ceded to the United States a Canal Zone 10 m. wide and extending from the Atlantic coast to the Pacific. The United States paid Panama $10,000,000 and agreed to pay annually the sum of $250,000, beginning nine years after the ratification. This treaty gave the United States the right to construct and control the canal.

CONSTRUCTION. Previous to the ratification of the treaty with Colombia, a canal commission of seven members had been appointed, and some work was done in 1904 and 1905, but work was not actively begun until 1906. Previous to this, a board of consulting engineers appointed by President Roosevelt reported on the type of a canal best suited to the location and the demands that would be made upon it. The board failed to agree and majority and minority reports were submitted to Congress. The first advocated a sea-level canal, and the second, a lock canal. This second report was finally adopted by Congress, and the construction of a canal, with the dimensions given at the beginning of this article, was authorized. In 1905 the commission was reorganized, and authority was concentrated in three members, who were to reside in the Canal Zone. In 1907 the work was placed in charge of the engineer corps of the regular army and under the immediate direction of Lieut.-Col. George W. Goethals as chief engineer.

The four great problems which confronted the commission at the outset were sanitation of the Canal Zone, control of the Chagres River, the construction of the locks and the Culebra Cut.

*Sanitation.* The construction of the canal required constant employment of an army of 40,000 men, only a few of whom were residents of Panama. The greatest drawbacks that the French encountered, obstacles greater than any problems in engineering, were yellow fever and malaria. The United States Government realized that before successful work could be done the causes of these diseases must be removed. These causes were mosquitoes and impure water. Immediate steps were taken to place the two cities, Colon and Panama, in a sanitary condition. Both cities were provided with a supply of good water, and the disease-bearing mosquitoes were rapidly exterminated. So vigorously was the work of sanitation prosecuted that within two years the Canal Zone was transformed from one of the most pestilential regions to a region of normal healthfulness.

*Chagres River.* For more than one-half its distance the canal passes through the Chagres River Valley. It was necessary to secure control of this stream, because it is subject to sudden overflows, due to tropical rains. The difficulty has been overcome by constructing a dam at Gatun and impounding the waters of the river, forming a lake 164 sq. m. in area. This dam is over a mile long, and when completed its top will be 105 ft. above sea level. It is provided with a spillway, which will keep the surface of the lake at 85 ft. above sea level.

*Locks.* There are 12 locks in the canal, all in duplicates. There are three

# MAN'S GREATEST ENGINEERING ACHIEVEMENT

FIRST WATER ENTERING UPPER MIRAFLORES LOCK

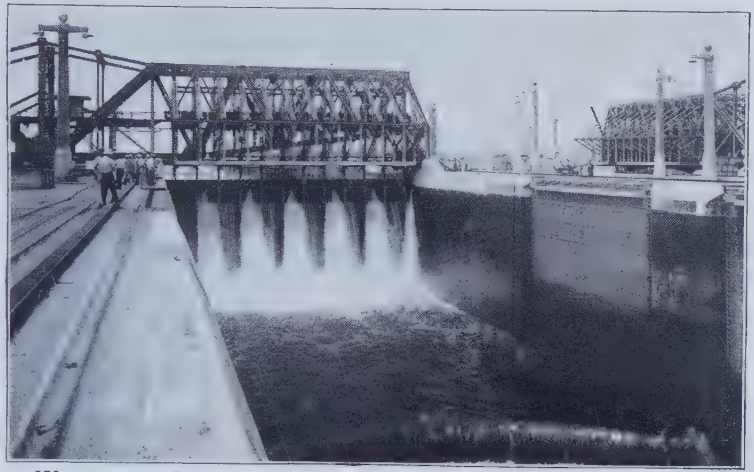
The lock is 1000 feet long, 110 feet wide, 27⅓ feet deep.

THE FIRST BOAT THROUGH THE PANAMA CANAL

# HOW THE PANAMA CANAL ZONE LOOKS FROM AN AEROPLANE

The gate at the first Gatun Lock swings open and the ship from the Atlantic enters. (See Bird's-Eye View on opposite page.)

The gate is closed by electric power, water pours into the first chamber and the ship rises with the water level.



We pause at Gatun to inspect an emergency dam to be used if an accident befalls the gates.

Culebra Cut is reached after the ship has steamed at full speed through Gatun Lake.

At Pedro Miguel Lock the ship takes a downward "step" toward the Pacific level.

Miraflores Locks are next reached. This picture shows how the ships are towed by electric engines.

The water in the first Miraflores Lock is lowered, the gates swing open and the ship passes on to the last "step."

When the gates in the distance open, the water will seek the Pacific level and the ship can pass on to the great ocean.

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pairs in the flight of Gatun, one pair at Pedro Miguel and two pairs at Miraflores. The combined height of the locks at Gatun is 85 ft.; of that at Pedro Miguel is 30⅓ ft.; and of those at Miraflores, 54⅔ ft. All locks are of the same size, 1000 ft. long and 110 ft. wide. The walls and floors are of concrete, and each chamber has water-tight gates at the ends. The gates are of steel 7 ft. thick, 65 ft. long and from 47 to 82 ft. high. They weigh from 300 to 600 tons each. The main culverts through which the locks are filled and emptied are 18 ft. in diameter. Lateral culverts extend from these to the chambers.

*Culebra Cut.* The Culebra Cut, where the canal crosses the watershed to the Isthmus of Panama, was the most stupendous piece of work connected with the project. At its deepest point the cut is 494 ft. deep and at the top it is about half a mile wide. Owing to slides the amount of excavation was greatly increased. A working force of about 8000 was constantly employed on the cut, and when the work was at its height it required 160 trains of 24 cars each to haul away the material each day. The rock, which is soft, was blasted by dynamite and then loaded on cars by steam shovels having capacities of from three to five cubic yards. The trains were unloaded by plows, and it required only six minutes to unload a train carrying 600 tons of material.

Statistical Comparison. The Panama Canal is the greatest engineering enterprise in the world. The following comparisons, which were taken from the *Scientific American,* give some idea of the magnitude of the work. The total excavations of the completed canal amount to 212,227,000 cubic yards. This is enough material to make 63 pyramids, each as large as the Great Pyramid of Egypt. If placed side by side, these pyramids would extend over a distance of 9 m., or the material would fill a canal 55 ft. wide and 10 ft. deep across the United States. The concrete used in the locks and dams would make a pyramid 960 ft. square at the base and 400 ft. high. A train of cars long enough to hold the excavated material would extend around the earth four times.

Commercial Importance. By use of the canal the water route between New York and San Francisco will be shortened 7873 nautical miles, and that between New Orleans and San Francisco 8868 nautical miles. The distances between the Atlantic ports of the United States and the Pacific ports of South America will be shortened from 4291 to 7245 nautical miles. The distances from New York to Australian and New Zealand ports will also be greatly shortened. Distances between the Atlantic and Gulf seaboard of the United States and ports in China and Japan are about the same via the Panama and Suez canals; therefore these waterways will be competitors for this trade.

Electrification. The locks are operated by electricity, and ships are hauled through them by electric locomotives which move on tracks beside the canal. The power at the Gatun Locks is furnished at the spillway, and that at Miraflores in a similar manner. Over 1000 motors are required to operate the canal.

Fortifications. The entrances to the canal are guarded by the strongest fortifications in the world. At the Atlantic entrance they consist of two 14-inch and two 6-inch guns, and eight mortars of the most approved pattern. On Manzanilla Point, Colon, they consist of two 6-inch guns; and on Margarita Island, of two 14-inch and two 6-inch guns.

At the Pacific entrance the fortifications are located on three small islands and consist of one 16-inch gun, two 14-inch guns, two 6-inch guns and 12 mortars. The locks and machinery are guarded by a mobile inland force of about 7000 men.

Control. With the completion of the canal the old commission was retired. On Apr. 1, 1914, the new system of government of the Canal Zone was inaugurated, with the following departments: operation and maintenance, purchasing, supply, accounting, health and the executive secretaryship. President Wilson ap-

pointed Col. George W. Goethals the first governor.

Opening. The canal was opened informally on Aug. 15, 1914, with the passage of the government vessel *Ancon* from the Atlantic to the Pacific.

**Panama, Republic of,** a republic of South America, formerly a department of Colombia, from which it seceded in 1903. The republic occupies practically all the isthmus joining North and South America, is 350 m. long, from 40 m. to 120 m. wide and has an area of 31,600 sq. m., about the same as that of South Carolina. The country is mountainous, has a tropical climate and is subject to heavy rainfall. The mountain slopes are covered with forests and other tropical vegetation. Along the coasts are rich grazing lands. There are only two cities of importance, Colon, or Aspinwall, on the Caribbean coast; and Panama on the Pacific coast. The people are mostly of Spanish, Indian and negro origin, and there are but few whites. The population is estimated at 419,029.

History. The Isthmus of Panama has been an important strategic point ever since the settlement of the New World. In 1846 the United States ratified a treaty with New Granada (now Colombia) by which this country guaranteed the neutrality of the isthmus and free transit over the Panama Railroad. After the ratification of the treaty the United States was obliged to interfere several times to keep the railway open. With the commencement of the Panama Canal, this little strip of country assumed a world-wide importance, and this importance led to the formation of the republic.

In 1903, John Hay, secretary of state for the United States, and Dr. Herran, minister of Colombia, negotiated a treaty providing for the construction of the Panama Canal by the United States, and when in July the Colombian Government refused to ratify this treaty, Panama withdrew from Colombia and formed an independent republic, which was at once recognized by the United States. See Panama Canal.



**Pan-American Congress,** an international conference of representatives from the United States and from 17 states of Central and South America which assembled at Washington, Oct. 2, 1889, on the invitation of the United States. Its purpose was to discuss the formation of an American Customs Union, under which the trade of American nations with one another might be maintained. San Domingo was the only state not represented at the Congress, which was presided over by James G. Blaine, the secretary of state, through whose efforts the work was chiefly planned. The Congress continued for five months without final adjournment.

The Congress of 1901-1902. The second Pan-American Congress convened in the City of Mexico, Oct. 22, 1901, the Government of Mexico calling the Congress at the suggestion of President McKinley. Plans for the construction of a railroad to connect North and South America were discussed, as well as arbitration, and the matter of the establishment of a standard silver coin, which shall be legal tender in all the countries represented, received attention.

The Congress of 1906. The third Congress was held at Rio de Janeiro, Brazil, in July and August, 1906. The principal topics considered were commercial relations, codification of laws and the "Drago Doctrine," named from Dr. Drago, the Argentine minister of foreign affairs. This doctrine declared that debts owing by South American nations to the nations of Europe cannot be collected by forcible intervention.

The Congress of 1910. Buenos Aires, South America, was the place of meeting of the fourth Congress, beginning in July of that year. At this conference a resolution was offered recommending that all American states bind themselves to submit to arbitration all claims for damage which cannot be settled through ordinary diplomacy, and renamed the Bureau of American Republics, established as a result of the Congress of 1889, the Bureau of Pan-American Union. See Pan-American Union, Bureau of.

**Pan-American Union, Bureau of,** a bureau organized as a result of the Pan-American Congress in 1889. When first organized it was known as the Bureau of American Republics, but was renamed by the Congress of 1910. It is under the control of the state department and comprises a committee of which the secretary of state is the chairman, having one representative for each country belonging to the union. The bureau issues a monthly bulletin and an annual report, which are regarded as standards of authority for the dissemination of information, between the countries associated, concerning the commercial conditions, systems of weights and measures and patent, trade-mark and copyright laws. Another purpose is to secure the adoption of a common legal-tender silver coin of all countries and to perfect a plan for the arbitration of disputes. See PAN-AMERICAN CONGRESS.

**Pancreas,** *Pan' kre as,* a long, narrow, flat gland in the human body, situated behind the stomach and lying transversely. In the adult it is from six to eight inches in length, about an inch and a half wide and one inch thick. Its average weight is about three ounces. It is traversed from end to end by a duct, which carries its secretion, the pancreatic juice, into the small intestine. The pancreatic juice is a colorless, watery-looking liquid, and has the remarkable property of acting upon all food elements, converting starch into sugar, proteids into peptones and fat into emulsion.

**Pando'ra** (all-gifted), according to Greek myths, the first woman of earth. At the command of Jupiter, Vulcan fashioned her, the gods each endowed her with a charm, the Seasons and Graces robed her. Thus, lovely, Mercury brought her to Prometheus. Her presence was intended as a punishment for his having stolen divine fire for man. Prometheus would not receive her. His brother, however, Epimetheus, welcomed her to his home, in which stood a jar that he had been cautioned never to open. Pandora, impelled by curiosity, disobeyed this command, whereupon there flew out all the ills that beset body and mind of man. One thing only remained, Hope. Other accounts relate that the jar contained blessings, not trials, which, barring Hope, escaped.

**Pango'lin,** an Old World member of the Pangolin Family and related to the Anteaters. It has the distinction of having the longest tail of any Mammal, for its caudal appendage consists of 49 vertebræ and is always at least twice as long as the body. The limbs are short and the forelegs have long claws which are doubled under in such a way that the animal walks upon the backs of them. The limbs and the body, which slopes to both head and tail, are covered with reddish scales that are soft when the animal is young, but harden with age and form a protective plate armor. When attacked the pangolin rolls up within this blanket of scales and forms a hard-shelled ball which its enemy may roll but cannot open. Ants and termites form the food of the pangolin, and are scooped into its mouth by means of its long, slender tongue.

**Panic,** *Pan' ik,* an economic crisis, resulting in the general depression of business. Panics usually follow periods of prosperity and business expansion. They are due to various causes, such as overproduction, overtrading, attempting to do too much business on credit and speculation in stocks. A panic usually starts with the failure of some large banking house, which carries down with it a number of smaller institutions with which it is closely identified. Depositors become frightened and make a run on the banks. Many of them have obligations due which they expect to meet with their balances in the bank. If these are not available, their obligations cannot be met, and this condition extends through the community or country. Business becomes paralyzed, money is hoarded and credit can scarcely be obtained. From such a state of affairs, business recovers very slowly.

Among the financial panics of England were those of the years 1799, 1815, 1825-6, 1847, 1857, 1866, 1873, 1885 and 1890.

Those in the United States occurred in the years 1814, 1837, 1857, 1873, 1884, 1893 and 1907.

The panic of 1893 illustrates the working out of a crisis and its effects. It extended into every trade and industry. Over 570 banks and banking institutions failed. Among many the evils and damages were permanent. Clearing-house certificates were in general use. Railways representing a mileage of 39,000 went into the hands of receivers; commercial failures with liabilities of $346,000,000 were reported; men were out of work; and riots were frequent. The period of depression was long and tedious.

National crises occur as a result of overrapid financial development of a country. What are popularly known as "booms" are often accompanied by panics because of the fact that financial adjustment is impossible when changes occur too rapidly. Local and temporary crises are caused by speculation, tariff or failure of crops.

**Panorama,** *Pan" o rah' ma,* a representation of an entire scene as viewed from one point. It generally consists of a painting arranged around the walls of a cylindrical-shaped building, together with objects to heighten the perspective, as well as the realistic, effects, and a central platform from which to view the same. The *Siege of Paris* was a painting exhibited in 1875-6 in panoramic form in the principal cities of the world, followed in 1888 by that of the *Battle of Gettysburg* and other war and Bible scenes. In arranging these paintings, many articles are used to heighten the illusion; for instance, a broken cannon wheel, apparently sunken in the ground, and muskets, swords and other military paraphernalia and accouterments scattered on the floor in front of the picture, but so placed as to seem a part of it.

**Pansy,** *Pan' zy,* a favorite cultivated plant of the Violet Family, introduced from Europe and grown in beds and gardens all over the United States. The plant has small, rounding leaves with juicy stems. The flowers are borne singly on the stems and are made up of flat, velvety petals surrounding a golden center. The pansy has a variety of names. Our common name is derived from the French *pensée,* the pansy being the symbol of thought. Shakespeare calls it love-in-idleness. Other fanciful names are heart's-ease, five-face-under-hood, battlefield flower, monkey's face and Johnny-jump-up. The last name is applied only to the smaller, longer-stemmed species. There are many varieties in cultivation.

**Pansy.** See ALDEN, ISABELLA MCDONALD.

**Panthe'on, The.** See ROME, ANCIENT.

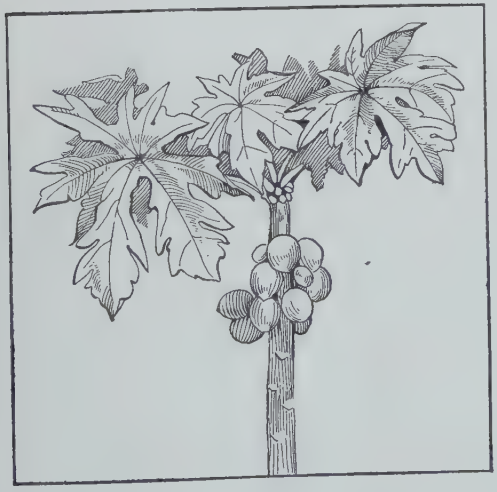
**Pan'ther,** a name applied in America to the cougar or puma and elsewhere to the leopard, especially the black species. See PUMA; LEOPARD.

**Pan'tomime,** the dramatic representation of ideas and emotions by gestures and attitudes rather than by words. This art was developed among the Romans, but, as their actors wore masks, it is evident that facial expression was not a factor in their mimicry. Commonly, however, a chorus sang, as interlude or accompaniment, the story represented by pantomimic action. In Italy and France there has usually been more interest in such efforts than in England; yet, since the first English exposition of pantomime at Drury Lane in 1702, the success of *The Necromancer,* at Lincoln's Inn Fields, in 1723, and further development in Joseph Grimaldi's *Mother Goose,* at Covent Garden in 1806, subjects for many pantomimes have been found in such popular tales as *Aladdin, Blue Beard, Cinderella* and *Little Red Riding Hood.* Pantomime has served on many occasions, both in England and the United States, to fill the theater's treasury and to supplement the legitimate drama.

**Pa'pacy.** See POPE.

**Pa'pal States,** or **States of the Church,** that section of central Italy which, till 1870, belonged to the popes. This territory was first claimed by the Church in 755, when Pippin, King of the Franks, defeated the Lombards who

were ravaging the Roman lands, and bestowed upon the Papacy the territories of Rome and Ravenna, besides Bologna and Ferrara, with a large section on the Adriatic. In 774 Charlemagne defeated the Lombards, who were a third time attacking Rome. He then not only confirmed the Grants of Pippin, but added new territories to the first grant. Matilda of Tuscany made a free gift of her possessions. During the political troubles of the centuries, much of the Church property was repeatedly lost and regained. When greatest it comprised 17,218 sq. m., with 3,124,668 inhabitants. After the Austro-Italian war in 1859 it was reduced to 4891 sq. m. with 692,106 inhabitants. Though the Italian ruler had bound himself in 1866 to respect the Papal States, King Victor Emmanuel took Rome by force in September, 1870, when a vote of the people was taken under military supervision, 133,681 favoring Sardinian control as against 1807 for the popes. Rome, therefore, became the capital of Italy in July, 1871. The pope is still supreme in the Vatican, which is regarded as extra territorial domain and never entered by the army of Italy.



PAPAW

**Papaw'**, or **Paw'paw''**, a fruit-bearing tree of the Custard Apple Family, growing in southeastern North America and frequently cultivated for ornament. It has a slender, cylindrical trunk with somewhat erect, branching stems, which bear long, narrow, deeply-lobed leaves, broader above the center and tapering below. The flowers are ill-smelling purple blossoms with three broad sepals and two rows of petals, one reflexed and one erect. The fruit has a thin, brittle rind, yellowish-green at first but becoming dark brown or even black as it matures. The pulp is soft and sweet and of a bananalike consistency; it contains many large seeds. Papaws are very common in the Mississippi Valley and their fruits are sold in large quantities in cities of the South.

**Pa'per**, a flexible material made of vegetable fibers, formed artificially into thin sheets for writing and printing, and fabricated into other forms for a large variety of purposes. The word *paper* is derived from papyrus, the name of a plant whose inner bark was used by the Egyptians as early as 2400 B. C. to form a fabric upon which they wrote. See PAPYRUS.

HISTORY. It is not known who was the original paper maker. Wasps build their nests out of a sort of paper made from vegetable fibers, and paper for commercial purposes is made by a somewhat similar process. It is claimed that a Chinese statesman was the inventor of paper, and we find in Chinese writings that a fabric made of silk waste was used to write upon as early as 300 B. C. Paper, is, no doubt, of Asiatic origin, and was used in China, Formosa and Korea before the Christian Era. The first rag paper in Europe was made in Spain during the Moorish Conquest in 1154, but it was soon afterwards made in Italy, France and Germany. It was not until the beginning of the 14th century that paper was commonly used in England, but in 1685 it began to be made there, and for many years the English handmade paper excelled that of other countries, particularly for fine books. In 1690, William Rittenhouse built the first paper mill in the United States, near Germantown, Pa., but it took over 100 years to develop the paper industry in

this country. The making of paper in quantities is now confined to Europe and North America.

MANUFACTURE. Formerly all paper was made by hand from linen and cotton rags, and while $14,000,000 worth of rags are now used each year in this country, they form only a fifth of the material available for paper making. Paper is demanded in such enormous quantities for newspapers (See NEWSPAPER) and for books that it has been necessary to find other materials besides rags; therefore the fiber of wood, such as that of spruce, poplar and similar woods, is now extensively used in making this class of paper, which is known as wood-pulp paper. Jute, straw, hemp, esparto (a Spanish straw), cotton, cornstalks and bagasse (the refuse of sugar cane), as well as peat, all furnish paper-making materials.

*Handmade Rag Paper.* When rags are used exclusively and the making of paper is by hand, the rags are dusted, sorted and cleaned, after which they are washed in hot water with chloride of lime to bleach them. They are then cut up or ground into a fine pulp, the consistency depending upon the thickness and quality of the paper desired. The tank containing this pulp and water is continually stirred, in order to make an even distribution of the pulp, to which a sizing or filling is added. Into this tank shallow boxes, called deckles, having bottoms made of wire screens with fine meshes, are dipped. The water is allowed to drain out as the box is raised, and a thin coating of pulp is evenly distributed over the screen. After the water is drained out, the box is inverted over a felt blanket, upon which a thin layer of this pulp is deposited and allowed to remain until the pulp is dry enough to hold together, when it can be removed to a drying room. When dry, this layer of pulp becomes a sheet of paper, the size of the sheet depending upon the size of the deckle. These sheets are now pressed to give them a smooth surface and greater strength, but they are rough on the edges and the surface is more uneven than that of machine-made paper. Some of the Oriental peoples still continue to make paper in this crude manner, and produce an article of high grade.

*Wood Pulp.* There are two kinds of wood pulp used in paper making: mechanical pulp, or ground pulp, and chemical fiber. The latter is made by three different processes: the soda, the sulphide and the sulphate processes, depending upon the chemicals used.

In making pulp, wood is ground by pressing blocks by hydraulic pressure or a screw on rapidly revolving grindstones, a stream of water carrying off the product, which is afterwards screened to remove lumps and splinters. It is then usually bleached and run into the beaters ready to be made into paper. Pulp is often made in a separate mill, which may be a long distance from the paper mill. The pulp is then shipped in sheets or receptacles, whichever is most economical.

The oldest process of making chemical fiber is the soda process, patented in England in 1854. A soft wood is barked, broken in small pieces and boiled under steam pressure with a solution of caustic soda, which dissolves everything but the cellulose (See CELLULOSE), which, when washed and bleached, produces a soft, white fiber. The sulphite process is an American invention, and employs in its improved form bisulphite of calcium instead of soda. The wood is placed in a digester, a tall tank 50 ft. high and about 15 ft. in diameter, lined with acid-resisting brick, and holding 20 tons of wood. Steam at a pressure of 80 lb. is turned on the wood, and a solution of bisulphite of calcium is forced into the digester by a pump. This process produces a strong fiber of good color that is not in all cases required to be bleached. The sulphate process consists in using sulphate of soda instead of caustic soda.

*Paper Making.* It is a common practice in America to combine the pulp of rags with that of wood fiber, and in making paper for newspapers, and for similar uses, 70 per cent wood fiber, 20 per

# FROM TREES TO BOOKS

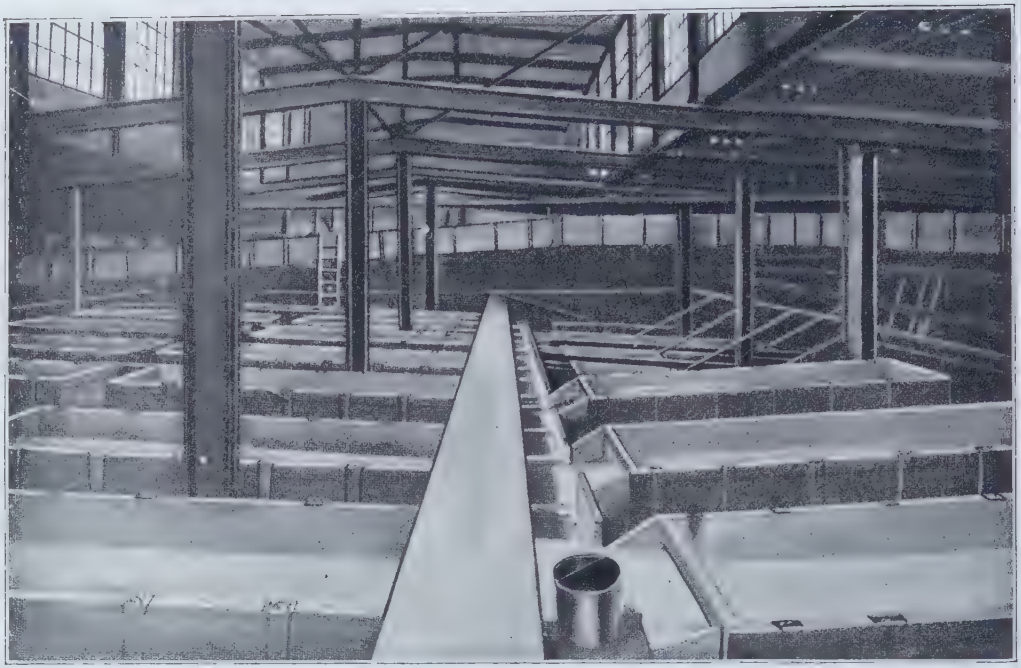
The trees of the forest—pine, spruce, basswood and others—are cut down and sawed into logs the same as in lumbering. By modern methods a tree can be made into paper in 24 hours.

The logs are taken by team and train to the saw and pulp mills. About 70 per cent of the material entering into paper used for newspapers and books is wood fiber.

When the logs arrive at the pulp mill they are sawed into lengths of about two feet for grinding into mechanical pulp, or made into chips for the sulphite process, which consists in boiling the chips in a solution of carbon bisulphite in huge boilers.

All photos by courtesy of the West Virginia Pulp & Paper Co.

# PREPARING THE PULP



The pulp goes to the screen room, where it is passed through plates perforated with slits only 1-100 of an inch wide, to remove all slivers and dirt. This is necessary to insure a perfect paper.

The next step is bleaching the pulp to a snow-white color. Lye, lime, chloride of lime and solutions of chlorine are used as bleaching agents.

# CHANGING PULP TO PAPER

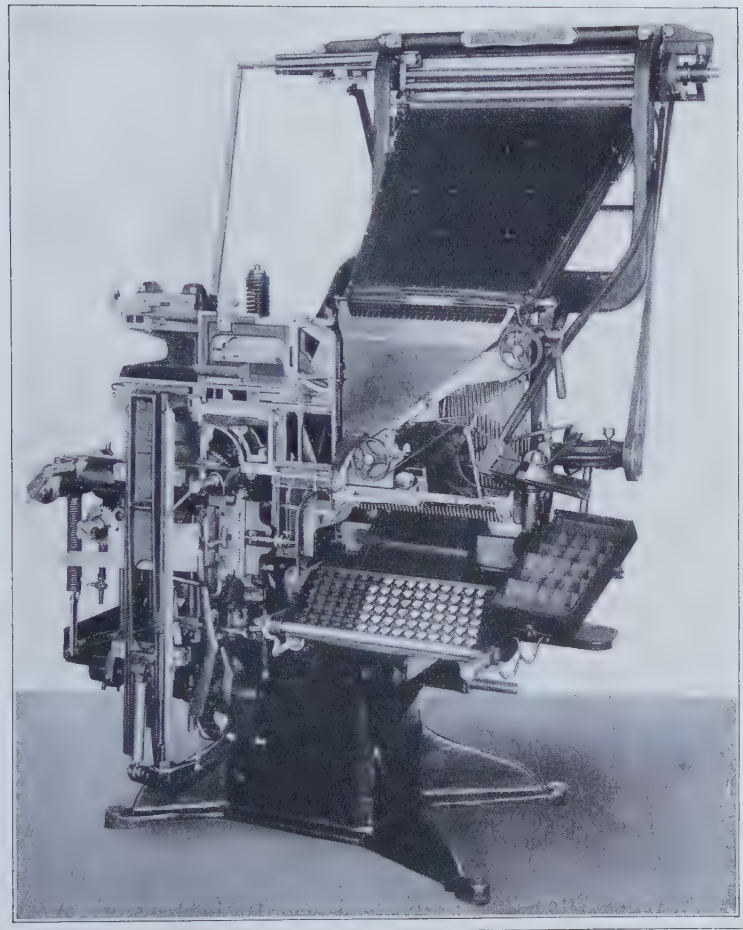
After bleaching, the pulp is sent to the beaters, or Hollanders, where the desired proportion of rag pulp and of China clay is mixed with it. It is then beaten until prepared for the paper-making machine. The beater consists of a hollow cone with a series of knives on the inner side, and within this a revolving cone with a similar series of knives on its outside. The pulp is ground between these sets of knives, which can be adjusted to secure various degrees of fineness.

The Fourdrinier machine is the most ingenious invention connected with paper making. It is from 150 to 180 feet long, and receives the pulp at one end and turns out the finished paper at the other. One of these machines will make about 500 feet of paper a minute and produce a sheet from 120 to 160 inches wide.

# MAKING PAPER READY FOR PRINTING

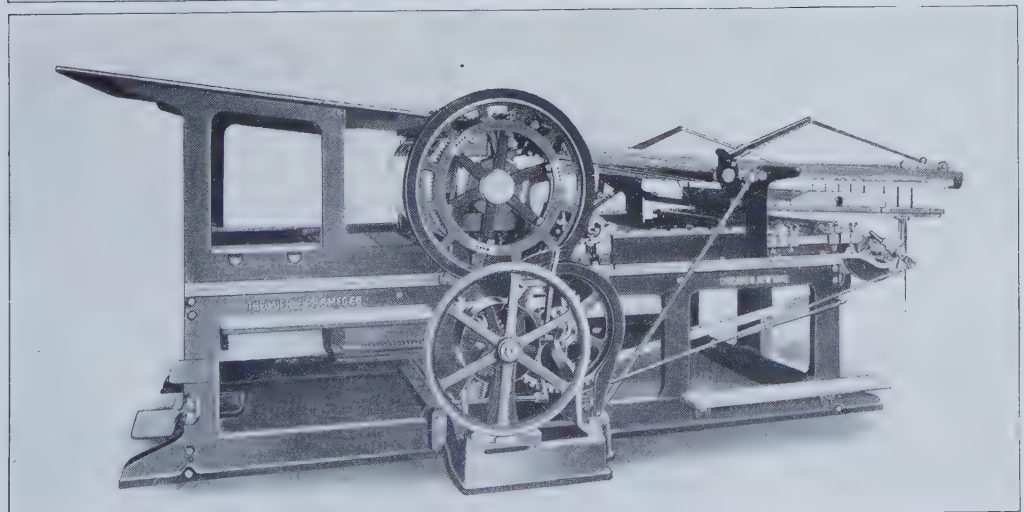
Paper comes from the Fourdrinier machine in a continuous band which is usually wound into rolls. These are taken to the cutting room, where they are cut into sheets and narrower rolls, to adapt the paper to the various uses for which it is desired.

For printing engravings and other high-grade illustrations such as those found is this work, a paper with a very high grade of finish is required. To produce this finish the paper is coated with a solution of gum and China clay, and then highly calendered. This illustration shows the paper in the drying room before calendering.



## THE MACHINE THAT SEEMS TO THINK

The linotype is the typesetting machine in most general use. All the type for this book was set on a linotype. The operator presses the keys much as a typist presses down the keys of a typewriter, and this brings into position the molds or matrices in which the type are cast. These matrices are filled with molten type-metal. The solid line of type is then delivered at the left of the keyboard and the matrices returned for use again.



Books are printed from electroplates. These are placed on the bed of a printing press like the one shown in the picture. The paper is fed into the press from the table at the left, and the printed sheet is delivered at the right.

cent rag pulp and 10 per cent China clay are used. The clay acts as a filler and adds to the finish of the paper. These ingredients are mixed in the beating engines with a size made of rosin soap dissolved in caustic soda and precipitated by an alum solution. For the reduction of the pulp into a very fine mass, the Jordan Engine is used. This consists of a stationary hollow cone mounted with knives on the inside. This cone fits over and engages with a solid, rapidly revolving cone supplied with similar knives on the outside. This cone is on a shaft, and is made adjustable so that as the pulp passes between the cones the knives can be brought together or separated with great accuracy in order that the desired degree of fineness may be secured. The pulp is pumped from this machine to a receiving tank, where it may be bleached or colored.

The Fourdrinier machine takes its name from its inventor, and is the most complete machine for the manufacture of paper in existence. It consists of three parts, which, when joined together, make a machine 180 ft. long. The first part consists of the deckle, which performs the same function on a large scale that the old hand deckle did on a small one. The first part, the paper-making part of the machine, is the most delicate as well as the most interesting. It consists of the deckle, an endless belt of wire gauze about 30 ft. long and the width of the sheet of paper. On this belt the pulp is spread as it flows from a tank. This flow is adjusted to the weight of paper desired, and the same machine can make tissue or newspaper by regulating the pulp. Beneath the deckle are two suction boxes, used to draw the water from the pulp. The belt of wire gauze passes over a series of rollers so arranged as to give it a vibratory motion, which distributes the pulp evenly over the gauze and also weaves it together, so as to make a sheet of uniform thickness and strength. The dandy roll placed above the belt of gauze between the suction boxes is a light cylinder covered with wire. It is so adjusted that it passes upon the upper surface of the layer of pulp and impresses upon the paper whatever design it bears. If the roll is covered with a wire mesh similar to that of the belt, a "wove" paper is formed. If it has parallel wires extending from end to end a "laid" paper is formed. The water mark, which is the imprint of the brand, is also on this roll and is impressed at each revolution. As the pulp passes over this belt, most of the water is drained out. It is then taken on a belt of felt and passed between a number of steam-heated steel rollers, which remove nearly all of the remaining moisture. As it leaves the last set of these rollers, the paper is separated from the felt and passes on through other rollers, which subject it to great pressure and further dry it and give it a smooth surface. The finished paper is delivered from the machine in rolls or sheets, according to the purpose for which it is intended. One of these machines is usually 18 ft. wide and 16 ft. high, and will turn out 500 ft. of paper per minute of a width of 160 or 120 inches. One paper-making corporation operates 32 mills and uses 96 of these machines.

Varieties. Coarse grades of paper and strawboard are made from wheat straw, esparto fiber and corn husks. The best quality of paper is known as linen paper, as formerly it was made from linen rags. Manila paper gets its name from Manila hemp, from which it was originally made. Much of the best book paper, especially that for printing illustrations, requires a high finish and a very smooth surface. This is given by passing the paper between alternate iron and compressed paper rolls. The paper is called supercalendered from the name of this machine. A large amount of paper is given a surface coating after it is made, that required for lithographic work (See Lithography) being usually coated with clays and glue or casein, while those for covering boxes, etc., are glazed by passing between a top roll of heated metal revolving faster than a lower roll of compressed cotton; a high

luster is given by using beeswax as a coating. Wall paper is printed from paper in the roll (See PAPER HANGINGS).

USES. Paper is used for many articles by being compressed and chemically treated (See PAPIER-MÂCHÉ). By a secret process a thread and yarn, known as zylolin, are made, which can be loosely or tightly spun and woven into fabrics, from which clothing of a durable character is made; this clothing is easily washed and ironed. Rugs, mats and carpets are made of this material and colored in fanciful designs in imitation of the rich Oriental rugs.

STATISTICS. There are about 1200 paper-making mills in operation in the United States. These make about 500 tons of writing paper per day, and the production of paper in rolls and sheets for newspapers is about 600,000 tons per year. The total paper consumption is 3,000,000 tons per year, of which 80 per cent becomes waste in three to five years. The mills of a corporation located at Millinocket, Me., require over 27,000-horsepower to operate their machinery and to furnish steam for cooking, dyeing, etc. Another paper-making corporation is capitalized at $110,000,000. The United States is the largest manufacturer of paper.

**Paper Hangings,** or **Wall Paper,** a term applied to webs of paper employed to cover walls and ceilings, usually for decorative purposes. The Chinese used paper hangings at a very early period, but they were not generally introduced into other countries until the 18th century. However, hangings of canvas, decorated and painted to imitate tapestry, were in common use 200 years earlier, and the manufacture of hangings of embossed leather was carried on in Italy and Spain during the 16th and 17th centuries, and later in France and England.

The first wall papers introduced were in imitation of these various hangings of tapestries, velvets and leather, and were made in sheets 22 inches by 32 inches, pasted together to form a length of 12 yards. These sheets were at first printed from blocks manipulated by hand, the pattern, or that which was to be in one color, being carved upon pear-wood boards; the delicate parts of the design were represented by small pieces of copper set in the block. These were fed with color by having a felt blanket soaked in the pigment and applied to the paper one tint at a time. When one tint was dry, it was followed by other blocks until all the colors and figures of the design were printed on the paper.

After the introduction of wall-paper printing machinery in England, the size of wall paper was changed to webs 21 inches wide and 12 yards long. The printing machine contained a large drum, grouped around which were a number of wooden rollers made in a similar manner to the blocks above described and each representing some part or color in the design. Through these were fed the paper webs very slowly and carefully in order that each roller might perform its part in the proper way and complete the design. Various improvements were later introduced until the development of grounding machines for putting on the background and bronzing machines for applying the powders in imitation of gold; embossing machines and a number of other devices were invented in order to produce the continuous process by which the paper passes automatically from one stage to another. All this was consummated in 1870, but great improvements in the blending and selecting of colors in which wall papers are now printed have been made since that date. The first wall-paper printing machine was put up in Philadelphia in 1844, and the business has gained rapidly in importance; the value of the product in the United States exceeds $12,000,000 a year, and there are about 40 factories employing over 7000 men. See PRINTING; TAPESTRY.

**Paper Money.** See MONEY, subhead *Paper Money.*

**Paper Nau'tilus,** or **Ar'gonaut,** a genus of Cephalopods of the Octopod Family. It resembles the cuttlefish in structure and in possession of an ink sac; but it

has no external skeleton and the female bears a coiled, ribbed shell, from which eight sucker-covered arms protrude. Two of these arms are broadly flattened and were once supposed to be held in air as the animal sailed across the sea. There is no muscular attachment between the female nautilus and its shell, but the flattened arms grasp the edges tightly whenever discretion tells the nautilus to descend beneath the waves; at the same time the ink sac exudes a dark-colored liquid, which conceals the flight until a safe refuge in the mud has been reached. These broad arms are also the implements with which the nautilus rebuilds any injured portion of its shell or adds to it when the structure becomes too small.

The paper nautilus is found in many warm seas, but chiefly in the Mediterranean, where the fishermen frequently take them up with their nets. Occasionally they are used as food, but are not highly valued for that purpose.

**Papier-Mâché,** *Pa" pya'-Mah" sha',* a general term given to materials formed by molding or pressing wood pulp or sheets of paper together so as to resemble wood. Many different methods of manufacture are employed. One process consists of taking a number of sheets of paper and thoroughly saturating them with water, then pressing them into a mold. The articles thus formed are then dried by heat and dipped into a mixture of linseed oil and tar, then baked, trimmed, planed and painted with several coats of tar and lampblack. Finally they are varnished, lacquered and polished ready for the market. Sometimes articles are inlaid with mother-of-pearl or otherwise ornamented.

Papier-mâché was first made in Persia, afterwards in India, China and Japan, and finally in France, Switzerland and Germany. Many varieties of articles are made of papier-mâché, chiefly those for ornamental purposes, such as boxes, trays, vases and light articles of furniture and architectural adornment. However, papier-mâché household articles, such as pails and tubs, are becoming common. When wood pulp is pressed to form car wheels and in making a mold of type for stereotyping, it is sometimes called papier-mâché. See PAPER.

**Papineau,** *Pa" pe" no',* **Louis Joseph** (1789-1871), a Canadian politician, born at Montreal, Canada. He studied at the Seminary of Quebec, and prepared for the practice of law. In 1809 and again in 1811 he sat in the Legislature of Lower Canada. He served in the War of 1812 with the rank of captain. In 1834 the "Ninety-two Resolutions," of which he was one of the authors and which insisted upon certain changes in the government, were sent to England. The "Resolutions" were not adopted and the Canadian people were warned against agitators. The next year Papineau arranged with William Lyon Mackenzie, the leader of the Revolutionary Party of Upper Canada, for a union of their interests. When the revolution finally broke out he fled to the United States, and later went to France, returning to Canada when a general amnesty was proclaimed in 1847.

**Papua,** *Pap' oo ah.* See NEW GUINEA, *Gin' y.*

**Papy'rus,** a large, reedy marsh plant of the Sedge Family. Its straight stems grow to a height of from 4 to 16 ft. but are entirely destitute of foliage, for the leaves, which are sharp-edged and coarse, spring from the same spreading rootstock as the stem. At the summit the stem divides into a cluster of shortened, umbrellalike branches. The flowers grow in short spikes and have neither petals nor sepals, but are surrounded by bristles, which, after the seeds are formed, lengthen into long hairs. Papyrus formerly grew in profusion in Egypt and Palestine, but it is now only sparingly found along the Upper Nile and is more common in Syria and southern Italy.

Papyrus is chiefly interesting from a historical standpoint, since it was used for writing material as early as 2000 B. C. before the clay tablets and stylus were known. It was prepared by cutting the inner bark, or outer pith, in thin strips which were laid side by side; over them other strips were laid crosswise. These

were then subjected to a high pressure, which, on account of the gumminess of the pith, fastened the two tightly together. The sheets were written upon with a reed pen with an ink made from charcoal and were rolled upon sticks while fresh; as the rolls stiffen with age, they are less easily unrolled. Because of the dryness of the Egyptian climate, many papyrus manuscripts of great age have been preserved; a large collection of them, most of which have been translated, lies in the Berlin Museum.

Papyrus fiber is now used in the manufacture of rope, sailcloth, sandals, coarse garments and mats. Lately it has been applied also to the manufacture of modern paper. Papyrus is said to be the bulrush mentioned in the Old Testament.

**Pará,** *Pah rah',* or **Belem,** *Ba leng',* a city and seaport of Brazil, capital of the State of Pará, situated on the right bank of the estuary of the Pará River. Among the chief buildings are the cruciform cathedral, the bishop's palace, the Episcopal Seminary, the government and municipal palaces, the Peace Theater and several hospitals and colleges. The port is the entrance of the Amazon Valley and Pará is the principal commercial city in northern Brazil. The chief exports are cocoa, rubber, Brazil nuts, rice, drugs, isinglass, palm fiber and deerskins. The city was founded in 1615; the inhabitants, including those of the surrounding rural districts of the municipality, are largely Portuguese and Indian. Population, about 200,000.

**Parachute,** *Pair' a shoot,* a device shaped like an umbrella, but without the ribs, and usually about 25 ft. in diameter when opened. It has a small circular opening in the center. It is shut and attached to a balloon by cords, so that the aeronaut, when wishing to descend by reason of accident to the balloon or otherwise, pulls certain cords, which let the parachute free, and in its descent it spreads out, allowing him to descend slowly. Its invention is accredited to Sebastian Lenormand (1784). See BALLOON.

**Par'affin,** a material consisting of a mixture of several hydrocarbons, having a colorless, translucent, waxy composition, and without taste or smell. It is chiefly and most economically obtained from petroleum and other liquid oils by distillation. It is also produced when bituminous shale, coal, wood, lignite or peat is heated in retorts. Paraffin is extensively used in the arts. Mixed with wax it forms an important ingredient of candles, and it is employed in the manufacture of wax or paraffin paper. See PETROLEUM.

**Paraguay,** *Par' a gway,* a small republic of South America, bounded on the n. by Bolivia and Brazil and on the e., s. and w. by Argentina. The Pilcomayo River marks its western limits, and the Paraná its eastern, while the Paraguay, a great tributary of the Paraná, crosses it centrally. Its area is 171,200 sq. m., or about the same as that of Kentucky, Tennessee, Alabama and Mississippi combined. The adjoining republic, Bolivia, is over four times the size of Paraguay.

PHYSICAL CHARACTERISTICS AND CLIMATE. Paraguay is, in general, a region of low elevation. Its mountains, which lie in the north and east, are little more than high hills, nowhere more than 1400 ft. in height. In the south the country is swampy, and rice is abundantly raised. The climate of Paraguay is tropical, but healthful, and the fertility of the soil renders vegetation so luxuriant that the scenery has a softness of beauty that renders it especially attractive. The great forests are a source of valuable dyewoods, timber, drugs, oils, perfumes and gums. Maté is a shrub whose leaves furnish the tea of the inhabitants. On the cultivated tracts sugar, tobacco, cotton, maize and vegetables are raised, and great herds of cattle graze upon the hills. The greater part of Paraguay lies in the Gran Chaco regions where lakes are plentiful in the rainy season, but disappear during the drought. The exports of the country are maté, tobacco, sugar, quebracho, rubber, hides, tallow, cattle, wool and leather.

GOVERNMENT, PEOPLE, ETC. The government of Paraguay is administered by a president, and its Congress consists of a Senate and a House of Deputies, whose members are elected directly by the people. The country is divided into 20 counties. The people are of mixed Spanish and Indian descent and are of a high type of civilization. Education is encouraged, and at Asuncion, the capital, are a national college and an agricultural college. Catholicism is the principal religion.

HISTORY. Originally Paraguay belonged to Spain, and the first settlement was made by 600 adventurers at Asuncion in 1536. About 1586 Jesuits entered the country, ruling it from 1609 to 1768. Early in the 19th century Paraguay was freed, by one blow, from Spain. José Francia, secretary of the revolutionary junta of 1811, became one of its two consuls. In 1816 he was made absolute and perpetual dictator, and actually was, for the following 25 years, "the Government of Paraguay." His policy was one of complete isolation, commercial and political.

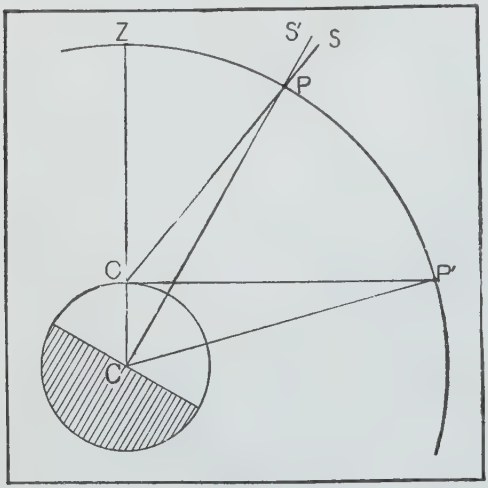
In 1844 Carlos Antonio Lopez became president for a nominal term of ten years, which, however, meant for life. His tendencies were liberal, and in 1845 he opened the country. In 1862 he was succeeded by his son, Francisco, who had been his minister of war. The new ruler made commercial treaties with the United States and the leading powers of Europe, and most ably promoted agriculture and home industries. But a war against Brazil and Argentina, 1864-1870, almost annihilated Paraguay. For the following few years the country was under a Brazilian protectorate. By 1876, however, it was free from foreign control. Later a popular constitutional government was established. Paraguay has been singularly free from civil strife, and, in consequence, has since made favorable strides in population and prosperity. It is on most friendly terms with its neighbors. Population, 752,000.

**Paraguay River,** a long river of South America, rising by many branches in mountains of southwestern Brazil. It flows in a southerly direction, forming for a distance the boundary between Brazil and Bolivia. The Paraguay was once the western limit of the Republic of Paraguay, but the Pilcomayo, a western branch of the Paraguay, now marks its boundary. Beyond their juncture, however, the two rivers separate Argentina from Paraguay, and at the extreme southwestern angle they join the great Paraná, under which name all flow into the broad estuary of the Plata. The river is 1600 m. long and is a regular means of communication between Asuncion and Buenos Aires. Asuncion, the capital of Paraguay, is situated near its union with the Pilcomayo.

**Paraguay Tea.** See MATÉ.

**Par'allax,** the difference in the direction of an object as seen from two different places. There are two kinds of parallax: diurnal parallax, which becomes horizontal parallax when the object observed is at the horizon; and annual parallax. In astronomical calculations the position of a star as seen from the earth's surface is called its *apparent* place, and as seen from the center of the earth is called its *real* place. In the illustration let C be the center of the earth; O, point of observation on the surface of the earth; Z, the zenith; and P, the star under observation. The line OP′ is the horizon and perpendicular to the line CZ passing through the center of the earth. Now, seen from O, the star is seen at S. If the observer were at C, however, the star would be seen at S′, or at the same place as if it were seen from the center of the earth. Yet the star is really in the same place for all observers. Therefore it is agreed among astronomers to reduce all their calculations to the place a star would seem to occupy if seen from the center of the earth, called its real place. The angle OPC is the angle of parallax. The *horizontal parallax* of a star is the angle made at the star by a line drawn from the center of the earth, and the horizon line. The parallax of a star higher in the sky, as at S′, is at the apex of a

smaller angle formed by lines drawn from the center of the earth and the point of observation. As the star rises higher toward the zenith (Z) the angle measuring its parallax grows constantly smaller until at the zenith it is nothing, the line from the center of the earth passing through the point of observation.




PARALLAX

Annual parallax is estimated upon the same principles; but a line drawn from opposite points of the sun's orbit instead of the radius of the earth is taken as a base. Parallax is an exceedingly important element in astronomy, for upon it astronomical measurements depend, as the distance of sun, moon and stars. It is also exceedingly important in nautical estimates of latitude and longitude.

**Paral'ysis,** or **Pal'sy,** a partial or total loss of the power of motion, due to interruption of the nerve impulses, which stimulate the muscles to normal activity. In some cases there is a loss of sensation, but not of motion, while in others the power of motion is lost, but sensation remains. Paralysis may affect the right or the left side of the body or the upper or lower extremities. It is rather a symptom than a disease, and may be caused by a wound or other abnormal condition in the nerve trunks or in the nerve centers of the brain, spinal cord or ganglia. A clot of blood on the brain is a not infrequent cause of paralysis. Persons may recover from a stroke and appear to be restored, but one attack predisposes to others. The second or third manifestation is often followed by death. See NERVOUS SYSTEM.

**Paraná,** *Pah" rah nah',* a large river of South America, is formed in the State of Minas Geraes, in Brazil, by the confluence of a number of small streams. It flows southwesterly, then westerly, forming the boundary between Paraguay and Argentina on the south. It then receives the Paraguay and flows southeasterly. After it is joined by the Uruguay it forms the broad estuary known as the Plata or Platte. Its length is estimated from 2200 to 2800 m. Just as it leaves Brazil it is precipitated over a ledge forming the Falls of Guayrá, and immediately below is a series of rapids. Because of these obstructions navigation is restricted to the lower part of the river. Large vessels ascend as far as Rosario. The Paraná, next to the Amazon, is the largest river of South America.

**Par"asit'ic Diseases.** See BACTE'RIA.

**Parcel Post.** The Sixty-second Congress enacted a law establishing a limited parcel post within the United States and its outlying possessions. The law became effective Jan. 1, 1913. For purposes of the administration of the parcel post the United States and its outlying possessions, excepting the Philippine Islands, are divided into units of area 30 minutes square, identical with a quarter of the area formed by the intersection made by the parallels of latitude and meridians of longitude, as represented on authorized postal maps of the country. These units are made the basis of eight zones. The first zone has a radial distance of approximately 50 m. from the center; the second, a radius of approximately 150 m.; the third, of 300 m.; the fourth, of 600 m.; the fifth, of 1000 m.; the sixth, of 1400 m.; the seventh, of 1800 m.; and the eighth, all territory beyond the seventh, excepting the Philippine Islands, which are excluded from the privileges of the law.

Parcels cannot exceed 84 inches in length and girth combined, and are limited to 20 lb. in weight, except within the first and second zones, where the limit is 50 lb. Parcels must be so wrapped that their contents will be amply protected, and that they can at the same time be readily examined by the postal authorities. The name and address of the sender following the word *From* must be placed on the wrapper. They must be mailed at the post office or a postal station, or be delivered to a rural or other carrier duly authorized to receive them. Postage must be fully prepaid by stamps. Large firms may, by special arrangement, pay the postage in money. Special delivery may be secured by payment of the usual fee of ten cents, stamps for which must be affixed to the parcel. Insurance of contents up to the value of $50 may also be obtained by payment of a fee of ten cents. The preceding table issued by the post office department gives the rates of postage for parcels ranging from 1 to 20 lb. The local rate for parcels weighing 50 lb. is $0.30; the zone rate is $0.54. These rates do not apply to packages less than four ounces in weight.

The following articles are not mailable:

Wine, malt, fermented or intoxicating liquors of any kind.
Poisons of any kind.
Poisonous animals, insects and reptiles.
Explosives and inflammable materials. (These include matches, kerosene oil, gasoline, naphtha, benzine, turpentine, denatured alcohol, etc.)
Infernal machines.
Chemicals or other devices or compositions that may ignite or explode.
Disease germs.
Revolvers.
Live or dead animals, birds or poultry. (Stuffed animals excepted.)
Rawhides, pelts, game or any article having a bad odor.
Matter that is manifestly obscene.

| WEIGHT | First Zone | | 2d Zone, 50 to 150 miles | 3d Zone, 150 to 300 miles | 4th Zone, 300 to 600 miles | 5th Zone, 600 to 1000 miles | 6th Zone, 1000 to 1400 miles | 7th Zone, 1400 to 1800 miles | 8th Zone, all over 1800 miles |
|---|---|---|---|---|---|---|---|---|---|
| | Local rate | Zone rate, 50 miles | RATE | RATE | RATE | RATE | RATE | RATE | RATE |
| 1 pound | $0.05 | $0.05 | $0.05 | $0.06 | $0.07 | $0.08 | $0.09 | $0.11 | $0.12 |
| 2 pounds | .06 | .06 | .06 | .08 | .11 | .14 | .17 | .21 | .24 |
| 3 pounds | .06 | .07 | .07 | .10 | .15 | .20 | .25 | .31 | .36 |
| 4 pounds | .07 | .08 | .08 | .12 | .19 | .26 | .33 | .41 | .48 |
| 5 pounds | .07 | .09 | .09 | .14 | .23 | .32 | .41 | .51 | .60 |
| 6 pounds | .08 | .10 | .10 | .16 | .27 | .38 | .49 | .61 | .72 |
| 7 pounds | .08 | .11 | .11 | .18 | .31 | .44 | .57 | .71 | .84 |
| 8 pounds | .09 | .12 | .12 | .20 | .35 | .50 | .65 | .81 | .96 |
| 9 pounds | .09 | .13 | .13 | .22 | .39 | .56 | .73 | .91 | 1.08 |
| 10 pounds | .10 | .14 | .14 | .24 | .43 | .62 | .81 | 1.01 | 1.20 |
| 11 pounds | .10 | .15 | .15 | .26 | .47 | .68 | .89 | 1.11 | 1.32 |
| 12 pounds | .11 | .16 | .16 | .28 | .51 | .74 | .97 | 1.21 | 1.44 |
| 13 pounds | .11 | .17 | .17 | .30 | .55 | .80 | 1.05 | 1.31 | 1.56 |
| 14 pounds | .12 | .18 | .18 | .32 | .59 | .86 | 1.13 | 1.41 | 1.68 |
| 15 pounds | .12 | .19 | .19 | .34 | .63 | .92 | 1.21 | 1.51 | 1.80 |
| 16 pounds | .13 | .20 | .20 | .36 | .67 | .98 | 1.29 | 1.61 | 1.92 |
| 17 pounds | .13 | .21 | .21 | .38 | .71 | 1.04 | 1.37 | 1.71 | 2.04 |
| 18 pounds | .14 | .22 | .22 | .40 | .75 | 1.10 | 1.45 | 1.81 | 2.16 |
| 19 pounds | .14 | .23 | .23 | .42 | .79 | 1.16 | 1.53 | 1.91 | 2.28 |
| 20 pounds | .15 | .24 | .24 | .44 | .83 | 1.22 | 1.61 | 2.01 | 2.40 |

The local rate is applicable to parcels intended for delivery at the office of mailing or on a rural route starting therefrom.

**Parchment,** the skins of a goat or sheep specially prepared for writing upon them. The skins are first soaked in lime to remove the hair; they are then scraped, shaved, washed, stretched and dried on frames. They are then rubbed with chalk and pumice powders to make them smooth. Parchment was used by

the ancients instead of writing paper and is still in demand for fine books and important documents, as well as for diplomas. Vellum is a very fine parchment made of the skin of a kid.

**Pardon,** the remission of the penalty of a crime or offense. A pardon may be granted before or after conviction, but usually the pardoning power is never applied until after sentence has been pronounced. A pardon is almost always an executive function, the power being held in the state by the governor, and in the nation by the president. In some states, however, this power is given to a state board of pardons before whom all applications for clemency must be made. When there is no state board of pardons the governor is given discretionary power. The Constitution of the United States vests the president with full pardoning power in all Federal cases, except that he cannot pardon one who is found guilty of any misdemeanor as the result of impeachment proceedings.

**Parent and Child.** Under this title are usually considered the legal relations existing between father and mother and children. This article treats of these relations as they exist with the legitimate children only. Parents are the natural and legal guardians of children and are entitled to their custody. Within reasonable limits they have the right to inflict punishment upon the child for misdemeanor, but excessive punishment, cruelty and abuse may lead to civil or criminal action by the proper authorities. According to common law, parents are not compelled to support their children, but this has been changed by statute in most cases so that they are made responsible, and neglect of such duty is subject to criminal action. In case the parent dies without a will, each child is entitled to an equal share of the property that falls to the children. The parent is not liable for crimes or other breaches of the law committed by the child, unless they were committed at his instigation.

**Paris,** *Pair' is,* in Greek myths, son of Priam, King of Troy, and of Hecuba. Since it was predicted before his birth that he was to be the ruin of his country, he was exposed as a babe on Mt. Ida. A shepherd, however, rescued him and reared him as his own child. Later, grown, serving as a shepherd and happily married to the nymph Œnone, he was called upon to decide who should have the golden apple for which Juno, Minerva and Venus were contesting (See Apple of Discord). Meanwhile, Cassandra, daughter of King Priam, had recognized him as her brother and he had been acknowledged a royal prince. As such, and in accord with Venus's promise to him that he was to have the fairest woman on earth for a wife, he went to Sparta. Here reigned Menelaus, husband of Helen, whom Paris stole, thus causing the Trojan War (See Helen). It is not generally believed that Paris, effeminate and vain, was a gallant hero of the struggle, although he afterward treacherously shot Achilles in the heel. He himself died from a poisoned arrow of Philoctetes, the nymph Œnone refusing to cure his wound. See Trojan War.

**Paris,** the capital of France and of the Department of the Seine, and the literary, artistic and social center of Europe since the decline of Rome. It is frequently referred to as the "City of Pleasure," and is the home of the freshest thought, the latest and most splendid luxuries, the newest fashions and the most extravagant wealth. Situated on both banks of the Seine River, 233 m. from its mouth, it occupies the heart of the so-called Paris Basin, and has an altitude of from 80 ft. (at the exit of the Seine from its fortifications) to 420 ft. (the hill of Montmartre in the northern part of the city). A wall encircles the city, and the total area with its boundaries is 19,279 acres, while 8 m. of the river are enclosed within these limits. Paris is said to be the greatest fortress in the world and possesses three distinct rings of defense (known as the "enceinte," the circle of detached forts around it, and the "new works").

Streets, Squares and Parks. There are building laws and regulations now

THE PALACE OF THE LOUVRE

In this group of buildings are gathered the most valuable art treasures in the world.

PARISIAN STREET SCENE

A view of the Boulevard de la Madeleine. To the left are the pillars of the Bourse.

in operation that control effectively both the form and quality of the constructions that are to be erected, and as a result there is a homogeneity about its buildings that forms a pleasant contrast to the promiscuous assortment of edifices of many another capital. There is pleasing unity, but not monotony, in its uniform sky line as well as street line, and to this, as fully as to the imposing attractiveness of its buildings, the city owes its reputation for beauty and harmony. The principal streets are the line of boulevards known as the *Grands Boulevards,* containing some of the most celebrated avenues of the world. The streets are kept scrupulously clean, and their wideness and brilliance are very attractive to the visitor; the life in the streets (in the cafés and restaurants fronting the sidewalks), with their chatting throngs, laughter and music, is very impressive by reason of its distinct individuality. The most magnificent square in the world is the Place de la Concorde, laid out under Louis XV; others include the Place de l'Étoile (containing the Arc de Triomphe de l'Étoile, the largest triumphal arch in the world); the Place de la République; the Place de la Bastille; and the Place Saint-Michel. The Gardens of the Tuileries are situated in the very heart of the city and are adorned with long lines of trees, numerous statues and playing fountains and basins. Other parks are the Gardens of the Luxembourg, the Jardin des Plantes, the Champs Élysées, the Bois de Boulogne and the Bois de Vincennes.

Buildings and Monuments. Prominent among the public edifices of Paris are its numerous churches, the Cathedral of Notre Dame undoubtedly remaining the most impressive. In classical style are St. Sulpice, St. Roch and St. Paul-St. Louis; other churches are the Sacré Cœur, St. Étienne-du-Mont, St. Germain-des-Prés and La Madeleine. The Palace of the Louvre is the most important of its civil buildings (See Louvre, Palace of the). The Palais de Justice is situated near the western end of the island of the city, and was abandoned as a royal residence for the use of courts. South of it is the Hôtel de Cluny, distinguished for its carvings and the grace and beauty of its architecture. The Hôtel des Invalides, the Palais du Trocadéro, the École Militaire, the Palais de l'Élysée, the Grand and Petit Palais des Beaux-Arts, the Palais Royal, the Palace of the Luxembourg, the Panthéon, the Observatory and the Hospice de la Salpétrière are other important buildings. Among the theaters and places of amusements are the Opéra, Théâtre Français, Théâtre Italien and the Odéon, all of which receive government support and are under strict supervision of the police. The largest theater in the world is the new opera house completed in 1875 at a total cost of $5,600,000 for the building alone, exclusive of the site. It contains the world-famed Grand Staircase and the handsomely decorated Foyer, and is the home of the best that the world has to offer in theatrical attractions.

The principal educational institution is the University of France, the chief buildings of which are located in the famous Latin Quarter, south of the River Seine. A new and magnificent building has replaced the old Sorbonne, and its extensive library is open to the public. Among other schools are the School of Medicine and the School of Law, the Jardin des Plantes (containing immense botanical and zoological gardens) and the École Polytechnique. The largest library is the Bibliothèque Nationale, containing over 2,600,000 volumes. The principal art treasures are contained in the incomparable Louvre, the Palais, or École, des Beaux-Arts, the Hôtel de Cluny and the Conservatoire des Arts et Métiers. Monuments of great beauty and artistic design are found everywhere throughout the city. In the very center is the famous obelisk of Luxor, 76 ft. high, covered over with hieroglyphics and brought to France from Egypt in 1836. The Arc de Triomphe du Carousel, the bronze statue of the Republic, Napoleon's column of victory, the Triumph of the Republic and the Arc de Triomphe de l'Étoile are other features.

Population. In 1911 the population of Paris was 2,888,110. Both the birth rate and the death rate are low, and the city is preeminently a town of adults. About eight per cent constitutes the foreign population, principally Italians, Swiss, Belgians, Germans, Russians, English, Americans, Spaniards, Dutch and Austrians. The bulk of the population is Roman Catholic; there are about 90,000 Protestants and 50,000 Jews.

Communication and Commerce. Electric tramways and omnibuses furnish the chief means of communication, and the cab system of the city is unexcelled. The electric railways are largely underground and over 35 m. are in operation. So efficient is the supervision of the traffic on the streets that, although it exceeds in density and amount that of any other city, they rarely give the appearance of being crowded and there is seldom a "block," but a continuous and uninterrupted stream gives a constant air of gayety to this, the most aristocratic and brilliant city in the world. The steamboats of the Seine are used to a large extent when the weather is favorable. All the principal railway systems of the country (except the Midi) have terminal stations in Paris, and the large stations are the Quai d'Austerlitz and the Gare Montparnasse. The total mileage of thoroughfares exceed 600, which are maintained at an annual cost of $2,500,000.

Industries and Commerce. Paris represents the industrial center of the country, but it is only within recent years that there has been a manifest tendency to the erection of large establishments. The products are brought out in small workshops and are distinguished for their elegance and artistic beauty. Printing, the manufacture of railroad supplies, chemical products, machinery, porcelain, leather, china, etc., are carried on in large factories, but for the production of clothing, furniture, gold, silver and aluminum ware, gloves and articles of luxury, the small workshop still holds its own, and in these products Paris surpasses the efforts of the rest of the world.

The annual trade of Paris is estimated at $600,000,000 in the products of its industry. The great financial institutions are the Bank of France and the three private banks, the Comptoir National d'Escompte, the Crédit Lyonnais and the Société Générale, the three last named having an aggregate capital of over $170,000,000. The city has always ready cash in abundance, and this, together with the stable bank rate, causes a prevalence of cheap money at all times. The Bourse, the stock exchange of the city, has only 70 memberships, which, due to their limited number, are inevitably very valuable, and the amount of business transacted there annually is estimated at about $20,000,000,000.

Government. For the purpose of administration the city is divided into 20 arrondissements, and four members from each arrondissement, elected by the people, constitute the municipal council, of which the prefect of the Seine is the head. Each arrondissement represents a unit of municipal administration and attends to the assessment and collection of taxes, keeps the registration lists of jurors and voters, administers the schools and libraries and different forms of charity work and receives and files the various applications for privileges and licenses. An efficient system of civil service aids the municipal government by its adequate control of the appointments and promotions of officials. A service of sanitary police enforces the health laws, and the sanitary conditions of dwellings are passed upon at regular intervals.

History. Paris is described in the *Commentaries* of Cæsar (under the name of Lutetia) as a collection of mud huts occupied by a Gallic tribe conquered by the Romans. St. Denis introduced Christianity in A. D. 250. In the fourth century the name was changed to Parisia, or Paris, and 200 years later Clovis chose it as his seat of government. The invasions of the Northmen caused heavy losses, but after the tenth century when

Hugh Capet, the founder of the Capetian dynasty, made it his residence, the city grew rapidly in numbers and importance. In 1589, when Henry of Navarre came to the throne, many improvements were begun, which reached their culmination under Louis XIV, to whom the city owes in large part its prestige as the center of European civilization. Following the reaction caused by the French Revolution came the further construction under Napoleon of buildings on a more magnificent scale than ever before, and during 12 subsequent years he lavished a vast sum of money on beautifying the city. The siege of Paris in 1870-71 wrought great damage, and the fire caused ravages of buildings which in beauty and worth can never be replaced.

**Paris, Tex.,** a city and the county seat of Lamar Co., about 93 m. n.e. of Dallas, on the St. Louis & San Francisco, the Texas & Midland, the Texas & Pacific, the Gulf, Colorado & Santa Fe and other railroads. The agricultural lands surrounding the city are noted for their productivity; cotton, fruits, vegetables, corn, oats and alfalfa are grown in large quantities. There are flour mills, cotton gins, large cottonseed-oil mills, cotton compresses, candy factories, a handle and crate factory, a canning plant, mattress and broom factories, woodworking shops and an iron foundry. Paris also contains a number of handsome buildings and noteworthy institutions. Among the former are a Federal Building, post office and county courthouse; while the latter includes a public library, hospital, Y. M. C. A. and schools. Paris was settled in 1841 and is governed under a charter of 1905. Population in 1910, 11,269.

**Paris, Treaties of,** the name given to important treaties of peace concluded at Paris, France, in 1763, 1783, 1814, 1815, 1856 and 1898.

The Treaty of Feb. 10, 1763, was concluded between Spain and France and Great Britain and Portugal, at the end of the Seven Years' War. By this treaty the political condition of America was altered. France ceded to Great Britain all her possessions east of the Mississippi, including Canada, Newfoundland and Cape Breton Island, except the island on which New Orleans is situated and two islands in the Gulf of St. Lawrence. To Spain was ceded the Province of Louisiana west of the Mississippi and the Island of Orleans. England returned Havana to Spain but received Florida in exchange. See FRENCH AND INDIAN WARS, subhead *French and Indian War.*

The Treaty of Sept. 3, 1783, between Great Britain and the United States, marked the close of the American Revolution and recognized the independence of the colonies. The Mississippi River was also recognized as the western boundary from a point west of the Lake of the Woods (See NORTHWEST TERRITORY). With regard to the fisheries it was provided that the Americans were to have the same rights which they had enjoyed as English colonists. See FISHERIES QUESTION; REVOLUTIONARY WAR IN AMERICA.

The Treaty of May 30, 1814, was concluded between France and the representatives of all the great powers of Europe. It provided that France should surrender all her conquests except slight territories on the northern and eastern boundaries, but no indemnity was required. Most of the colonies taken from her by Great Britain were restored, and Switzerland was declared independent.

The Treaty of Nov. 29, 1815, modified the Treaty of 1814. France was compelled to pay indemnities to the allied powers and consent to the occupation of her frontier by a large army for a period of five years, defraying the cost out of her revenues.

The Treaty of March 30, 1856, was concluded at the close of the Crimean War, and several important principles of international law were agreed upon and embodied in the Declaration of Paris. See CRIMEAN WAR.

The Treaty of December, 1898, terminated the Spanish-American War. By its terms Spain relinquished Cuba and

ceded the Philippine Islands, Guam and Porto Rico to the United States, receiving therefor the sum of $20,000,000. See SPANISH-AMERICAN WAR.

**Paris, University of,** at Paris, France (1200). This is one of the oldest and largest universities of the world. It developed naturally from a group of schools that became prominent during the latter part of the 12th century, and its organization became the model for numerous universities since established. In the 14th and 15th centuries it seems to have been the educational center of Europe and of the Christian world. A loss of prestige resulted from the development of other great universities, and from the political dissensions which had their culmination in the French Revolution. Yet today its student body is large and its library noteworthy; its influence is still world-wide. Like the University of Berlin, it enjoys all the advantages of a great city and the capital of a great people. It has over 12,000 students in all the departments.

**Park, Mungo** (1771-1806), an African traveler, born of Scotch parents near Selkirk, Scotland. He was educated at Edinburgh for a surgeon, but yielded to the desire for travel and sailed from England in 1795 under the employ of the African Association. During his first expedition he was imprisoned by a Moorish king, but finally escaped, returned to Scotland and wrote *Travels in the Interior of Africa.* In 1805 he undertook an expedition for the government and lost his life while exploring the Niger River. His writings were popular and widely read.

**Par'ker, Francis Wayland** (1837-1902), an American educator who did much for the common schools of the country, born at Bedford, N. H. He taught in New Hampshire both before and after the Civil War, during which he served in the Union army and won the rank of colonel. As superintendent of schools at Quincy, Mass., he gained a national reputation by his opposition to formalism and routine methods. He was supervisor of schools in Boston; and, after 1883, was for 13 years principal of the Cook County (now the Chicago) Normal School; was president of Chicago Institute; and, at his death, was director of the School of Education of the University of Chicago. He contributed to many educational periodicals. Among his books are *The Practical Teacher, Talks on Teaching* and *How to Study Geography.*

**Parker, Sir Gilbert** (1862- ), a Canadian novelist, born at Camden East, Addington, Ontario. He studied at Ottawa and at Trinity University, Toronto, and in 1885 went to Australia for his health. After serving as associate-editor of the Sydney *Morning Herald,* he later traveled in northern Canada. He took up his residence in London in 1897, and began to write fiction with great success. In 1900 he was elected to Parliament as Conservative member for Gravesend, and was reelected in 1906. He was knighted in 1902. He worked zealously for tariff reform and imperial preference, and his enthusiastic support of the cause of the Imperialists won for him a prominent place in the Unionist Party. His chief claim to distinction as a novelist rests on his admirable descriptive and dramatic Canadian stories, among which are *Pierre and His People, Mrs. Falchion, The Trail of the Sword, An Adventurer of the North, The Seats of the Mighty* and *The Lane That Had No Turning.* Other novels include *The Battle of the Strong, The Right of Way, Donovan Pasha, The Weavers* and *Northern Lights.*

**Parker, Theodore** (1810-1860), an American divine, born in Lexington, Mass. In 1830 he entered Harvard, but did not graduate, and, having taught school until 1837, he then settled as a Unitarian preacher at West Roxbury. Despite the fact that his views were considered heterodox, he soon became one of the most famous preachers of his time. In 1843 he visited England, France, Italy and Germany, and three years later he settled as a minister in Boston. Subsequently his eloquence was directed against the Mexican War and

slavery and in behalf of temperance. Ill health terminated his public career in 1859, and having first visited Santa Cruz and then Europe in the hope of recovery, he died in Florence. He bequeathed 13,000 valuable books to the Boston Public Library. His publications include *A Discourse of Matters Pertaining to Religion;* and *Sermons of Theism, Atheism, and the Popular Theology.*

**Par'kersburg, W. Va.,** a city and the county seat of Wood Co., 94 m. s.w. of Wheeling, on the Ohio River, at the mouth of the Little Kanawha River, and on the Baltimore & Ohio, the Baltimore & Ohio Southwestern, the Little Kanawha and other railroads. An electric railway connects with Marietta, Ohio; and passenger and freight transportation is provided by steamboat lines touching Pittsburgh, Cincinnati and other river points. An agricultural region lies about the city, and deposits of petroleum, coal and clay abound. There are numerous gas wells and valuable medicinal springs. Industrially, the city is of considerable importance, containing machine shops, iron foundries, oil-well supply works, oil refineries, flour mills, lumber mills, furniture factories, panel and veneer works and breweries. Coal, farm products and manufactured articles form the basis of a considerable trade.

Parkersburg has a number of important institutions and structural attractions. The two bridges, one across the Little Kanawha, and one spanning the Ohio, the latter constructed at a cost of $1,000,000, are both examples of excellent engineering skill. The Federal Building, city hall and courthouse are prominent buildings, and Washington High School and the Academy of the Visitation are notable. Other prominent features are a public library, a public park and Blennerhassett Island, not far distant. Settled in 1773, Parkersburg was incorporated in 1820 and is now administered under a revised charter of 1903. Population in 1910, 17,842.

**Par'kin, George Robert** (1846- ), a Canadian author and educator, born in New Brunswick and educated at New Brunswick and Oxford universities. Having entered the teaching profession, he was principal of College School, Fredericton, New Brunswick, for 15 years, and principal of Upper Canada College, Toronto, from 1895 to 1902, in which latter year he became organizing representative of the Rhodes Scholarship Trust. Previously, in 1889, he toured the Canadian and Australian colonies in the interest of imperial unity. The writings of Dr. Parkin include *Round the Empire, Geographical Unity of the Empire* and *Life of Sir John A. Macdonald.*

**Park'hurst, Charles Henry** (1842- ), an American clergyman, born in Massachusetts. He was educated at Amherst College and at the universities of Halle and Leipsic. After returning from his studies abroad, he became pastor at Lenox, Mass. In 1880 he moved to New York City and became pastor of Madison Square Presbyterian Church. Dr. Parkhurst was elected president of the Society for the Prevention of Crime, and was largely instrumental in inaugurating the investigations which resulted in the appointment by the Senate in 1894 of the committee to inquire into the police regulations and management of the city. The committee sustained the charges preferred by the Society for the Prevention of Crime. Dr. Parkhurst has published *The Blind Man's Creed* and *Our Fight with Tammany.*

**Park'man, Francis** (1823-1893), an American historian, born in Boston, Mass. He graduated from Harvard in 1844, studied, but never practiced, law, and soon determined to devote himself wholly to historical researches in connection with the rise, decline and fall of the French power in America. In preparation for this task he studied the Indian tribes of New York, New England and southern Canada, and later lived in the Black Hills of the Dakotas and in the Rocky Mountains. He related his experiences in connection with this expedition in his well-known book, *California and the Oregon Trail.* Many hardships endured on this trip affected his health per-

manently, but he continued his investigations both in his own country and in Europe (he visited Europe seven times), and published several important books. His eyesight gradually failed him until dictation and hearing others read to him were his only resort, and the struggle which followed was as heroic as any ever before or since endured by a man of letters.

In his works he combined the two qualities which make for enduring fame —the accuracy and indefatigability of a painstaking investigator and the consummate skill of an artist. His intimate knowledge of the wild life of the Indian has practically remained unsurpassed. Among his works are *The Conspiracy of Pontiac, Pioneers of France in the New World, The Jesuits in North America, La Salle and the Discovery of the Great West, Montcalm and Wolfe, A Half-Century of Conflict* and *Historic Handbook of the Northern Tour.*

**Parliament,** *Par' li ment,* the supreme legislative body of the United Kingdom of Great Britain and Ireland. Parliament is summoned by the writ of the sovereign issued out of Chancery, by the advice of the Privy Council, at least 35 days before its assembling. The annual session extends from the middle of February to about the end of August, or sometimes to the late autumn. Every session must end with a prorogation, and by it all bills which have not been passed during the session then lapse. A dissolution may be brought about by the will of the sovereign; or during the recess, by proclamation; or finally by lapse of time, the statutory limit of the duration of the existence of any Parliament being five years.

Parliament is divided into the House of Lords and the House of Commons. The House of Lords consists of the following: peers who hold their seats—(1) by hereditary right; (2) by creation of the sovereign; (3) by virtue of office—English bishops; (4) by election for life —Irish peers; (5) by election for duration of Parliament — Scottish peers. There are, besides, 14 peeresses of the United Kingdom in their own right, and three Scottish peeresses, and 19 Scottish and 65 Irish peers who are not peers of Parliament. The House of Commons consists of members representing county, borough and university constituencies in the three divisions of the United Kingdom. No one under 21 years of age can hold a seat in Parliament. Clergymen of the Church of England, ministers of the Church of Scotland, and Roman Catholic clergymen are disqualified from holding seats, as are all government contractors, all sheriffs and all returning officers of the localities for which they act. No English or Scottish peer can be elected to the House of Commons, but non-representative Irish peers are eligible. In August, 1911, it was provided by resolution of the House of Commons that a yearly salary of £400 a year be paid to the members of the House of Commons, other than those already drawing salaries as officers of the house. This provision was not extended to the House of Lords.

Formerly the House of Lords possessed the right to veto a bill passed by the House of Commons, and the only recourse for the government was an appeal to the country in a general election. If the electorate sustained the government, the lords were compelled to yield. Otherwise the ministry resigned. In August, 1911, a bill was passed which deprived the upper house of this form of veto. This bill provided: "If any public bill (other than a money bill or a bill containing any provision to extend the maximum duration of Parliament beyond five years) is passed by the House of Commons in three successive sessions (whether of the same Parliament or not), and, having been sent up to the House of Lords at least one month before the end of the session, is rejected by the House of Lords in each of these sessions, that bill, shall, on its rejection for the third time by the House of Lords, unless the House of Commons direct to the contrary, be presented to His Majesty and become an act of Parliament on the royal assent being signified thereto, notwithstanding that the House of Lords

have not consented to the bill: Provided that this provision shall not take effect unless two years have elapsed between the date of the second reading in the first of those sessions of the bill in the House of Commons and the date on which it passes the House of Commons in the third of those sessions."

The English Parliament grew out of the Anglo-Saxon Assembly. As early as the Norman kings it began to do its work in large committees. In the reign of Edward III, during the 14th century, Parliament was divided into two houses. In 1707 the Parliament of Scotland was united with that of England, and in 1800 there was a Parliamentary union with Ireland. Reform bills both for voting and representation were passed in 1832, 1867 and again in 1884, at which time the basis of the present franchise was laid. Parliament meets in an edifice known as the House of Parliament, in Westminster. Its legislative authority extends over the United Kingdom and all its possessions.

**Parliamentary Law,** those rules by which most deliberate assemblies agree to be governed. In its original application it referred to the usages governing the proceedings of the English Parliament; today the term includes all rules, precedents, customs and usages which have been generally accepted as most practicable in controlling deliberative bodies. In the United States no single compilation is accepted as a universal authority; the rules of Congress have great weight, yet every state Legislature compiles the rules under which its deliberations shall proceed.

The first principles of parliamentary law are that all business must be brought before the assembly through a motion or resolution, and that only one person has the right to speak at one time. The presiding officer recognizes the one who rises first, though it is within his discretion to recognize any other for special reasons. It is customary to require a second to every important motion in order to show that it has the support of more than one member. The motion is then stated by the chairman, and the maker of the motion is entitled to speak in its behalf. General discussion then follows and the rule is that no other question can be considered while the first question is under debate. An amendment may be offered and this must be disposed of before a vote is taken on the regular motion. If the amendment is adopted, the motion as amended takes the place of the original motion. An amendment to the amendment can also be offered, and if presented must be acted upon before taking a vote upon the original amendment. A substitute motion must pertain to the same question as the motion before the house. Its purpose is to dispose of the subject under consideration in another way. It takes precedence over the original or amended motion.

There are certain classes of motions, however, which takes precedence of all others. The first class, called subsidiary motions, are used to suppress or postpone the discussion of a question. Among these is the motion to lay on the table, that is, to postpone action until the measure can be taken up by consent of the assembly. This motion cannot be debated. The second subsidiary motion is the request of the previous question, which stops all debate and orders the question submitted to a vote. The motion for the previous question requires two-thirds for its adoption. There are also motions to commit, that is, refer to a committee; to postpone to a certain time; and to postpone indefinitely. There are also incidental questions of appeal, objection and suspension of the rules, all of which must be disposed of immediately upon their introduction. Finally there are so-called privileged questions including motions to adjourn or determine rights of the assembly. Voting is by voice, those favoring a motion saying "aye," those opposing it saying "no," by a rising vote or by ballot.

**Parnas'sus,** in Phocis, the highest mountain in central Greece, being 8070 ft. above sea level. One of its two "heads" was sacred to Bacchus; the

other, to Apollo and the Muses. Delphi, the Castalian spring and the Corycian cave were all on its southern slope.

**Par'nell, Charles Stewart** (1846-1891), an Irish leader for Home Rule. He entered Parliament for Meath County in 1875 and soon revealed his power in leadership and his skill in the use of Parliamentary tactics. He was successful in bringing the question of Home Rule for Ireland before Parliament, and in the advocacy of this measure received the support of the Irish dwelling in other countries, as well as in Ireland. By 1880 he had become the leader of his party. In 1886 he was influential in securing the victory of the Liberals, and the appointment of Gladstone as premier. However, his Home Rule bill was defeated. Shortly before his death he suffered a loss of reputation and political power.

**Parole',** in military affairs, the release of an officer or soldier from confinement on his word of honor. The most extensive use of the parole is in releasing prisoners of war, who are allowed to return to their homes on their promise not to reenter the ranks during the war or until exchanged. If this word is broken and the person is captured a second time he is liable to be sentenced to death. In some states the parole system is employed to release convicts from penitentiaries on trial. The state usually requires someone to be responsible for the convict paroled and to agree to furnish him with steady employment for a specified time. If the convict is orderly and industrious for a certain number of months, the parole is followed by a pardon; but if he becomes lawless, he is returned to prison.

**Pa'ros, Island of,** an island of the Grecian Archipelago of the group known as the Cyclades. It is one of the largest islands of the group, having an area of 96 sq. m. The famed Parian marble is secured from this island and is quarried chiefly upon the rugged slopes of Mount St. Elias, anciently known as Marpessa (See MARBLE). Grains and fruits are grown and wine and oils are exported. Population, about 8000.

**Parr, Catharine** (1512-1548), the sixth wife of Henry VIII, was the daughter of Sir Thomas Parr. She had twice been left a widow when, in July, 1543, she married Henry. She acted kindly towards her stepchildren, and persuaded Henry to restore to his daughters the right of succession. Distinguished for her learning and her knowledge of religious subjects, she was accused of heresy, but the King would not permit her arrest. After Henry's death she married Sir Thomas Seymour.

**Par'rakeet,** or **Paroquet,** *Par' o ket,* a name given to many of the small parrots with long, wedge-shaped tails and green plumage. The grass parrakeets, confined to Australia and Tasmania, are good examples of this group. They are more terrestrial in their habits than is usual in parrots, spending much time in grasses and reeds, feeding on seeds. The elegant grass parrakeet is one of the best known. It is about nine inches long; the upper parts are greenish-blue; the under parts, yellowish-green; and the abdomen, bright yellow. There is a deep blue bar on the forehead and a yellow patch near the eye. This parrakeet is found in large flocks.

**Par'rish, Randall** (1858- ), an American journalist and novelist, born in Illinois. After studying at the University of Iowa he was admitted to the bar and began the practice of law. In 1883-5 he engaged in prospecting in Arizona and New Mexico, later doing newspaper work in Denver, Omaha, Sioux City and Chicago, and acting as manager of country papers in Nebraska and Illinois. More recently he has been engaged in special commercial journalism in Chicago. He has been writing fiction since 1904. Among his popular novels are *When Wilderness was King, Prisoners of Chance, Keith of the Border, My Lady of Doubt* and *Molly McDonald.* He has also written a history of Illinois.

**Par'rot,** a name applied to a group of birds having strong, hooked bills, short legs with rough feet, with the hind toe turned backward. In size they range

from a small species about the size of a sparrow to the great macaws, which measure over three feet in length. The colors are usually gaudy, green predominating, but reds, blues and yellows are common. They are typically birds of the tropics, only a very few species being found in the temperate zones. No species is found in Europe, and but a few species occur in Asia and Africa. They nest in hollow trees and feed on seeds and fruit.

Of the 360 known species, about one-half are found in South America and a large number in Australia, where the most brightly colored species, called lories, are found. Several species of parrots are tamed and they can be taught to speak. Some have considerable intelligence, the yellow-headed Mexican parrot being one of the brightest. They are mischievous and often play laughable pranks.

**Par'sees,** the modern adherents of Zoroastrianism, the religion of ancient Persia prior to the introduction of Mohammedanism. After the Arabian invasion of the seventh century, when Persia was won over to the Islam faith, a large number of Zoroastrians left their country to gain greater religious freedom, moving to the city of Ormuz, on the Persian Gulf. Later they emigrated again, finally settling among the Hindus to the north of the modern Bombay. In 775 they were joined by a second band, and the community thus established flourished until 1315, when the Mohammedans invaded India. The Parsees sought refuge in the Bharhut hills and there preserved their ancient ceremonies. In the 16th and 17th centuries they spread widely through Gujarat and settled in various places. In 1901 there were 94,000 Parsees in India, all but 7000 of whom were settled in the Bombay Presidency and the adjoining State of Baroda; the rest were scattered as traders in the large towns. These people are remarkably liberal, thrifty, intelligent and progressive. They have in general remained faithful to the ancient teachings of Zoroaster, but some changes have crept into their customs. They are frequently designated "fire worshipers," a name which they consider a misnomer, as they regard fire as merely one of the emblems of the power of the good spirit Ormazd. See ZOROASTRIANISM.

**Par'sifal,** a music drama by Richard Wagner, first presented in Baireuth in 1882. The story is based on the King Arthur legend of Perceval and the Holy Grail and on the *Parzival* of Wolfram von Eschenbach (about 1205), but Wagner somewhat modified the original tale. The main characters are: Parsifal; Amfortas, a knight of the Grail who has fallen into the power of Klingsor, a hostile magician; and Kundry, one of the beautiful women through whom Klingsor hopes to gain authority over the knights by tempting them to break their vows of chastity. Amfortas has been wounded by the Holy Spear, which has fallen into Klingsor's possession. The scene is laid at Monsalvat, Spain, in or near the Castle of the Grail. Parsifal is forced by the knights to leave the castle, because of his indifference to the Grail. Withstanding the efforts of both Klingsor and Kundry to overcome him, Parsifal recovers the Holy Spear, then starts out in search of the Holy Grail, the value of which he now recognizes. After many years he meets Kundry, now repentant, and one of the knights, who leads him to the castle. Here he heals the wound of Amfortas by touching it with the Holy Spear. Kundry dies in happiness, after being baptized, and Parsifal is proclaimed king by the knights of the Grail.

**Pars'ley,** a plant of the Parsley Family, or order Umbelliferæ. The common parsley is a native of Europe, but is quite generally cultivated in gardens in the United States and used for seasoning and for table decorations. It has a smooth stem and curled or plain leaves. The variety with the curled leaves is usually preferred. Hamburg parsley has a large white root which is eaten much the same as the carrot and parsnip.

**Pars'nip,** a garden vegetable of the Parsley Family, raised for its sweet,

fleshy root. Cultivated, the roots are pleasing to the taste and are widely served fried or cooked with milk. They are generally of better flavor if left in the ground over winter. The stem is high and bears numerous downy leaves made up of several leaflets. The flowers are small and yellow, but grow in large, flat-topped clusters. In many localities the parsnip has run wild and become a troublesome weed; in that state its root is tough and flavorless and its stem coarse and unsightly. Other allied species, found in the woodland adding to its summer beauty, are the cow parsnip, wild parsnip and meadow parsnip. They are to be distinguished chiefly by their seeds and by the shape of their leaves. Cowbane, a very similar species, is a plant exceedingly poisonous if eaten.

**Par'sons, Kan.,** a city of Labette Co., about 137 m. s.w. of Kansas City, at the junction of the Big and the Little Labette creeks, and on the Missouri, Kansas & Texas, the Kansas City, Ft. Scott & Memphis and other railroads. There is natural gas here, which is used for light and heat. Among the industries are the manufacturing of farming tools, flour, feed and ice. In the town are grain elevators, machine shops and a foundry. Parsons is the seat of the Kansas State Hospital for the Insane, and has, among other attractive features, two parks, well-kept streets, a Masonic Temple, a Y. M. C. A. Building and a good railway station. The place was first settled in 1869 and called Mendota. In 1891 the city was granted a charter and since 1910 has been administered under the commission form of government. Population in 1910, 12,463.

**Parson's Cause,** a celebrated lawsuit, through which, in 1763, Patrick Henry was first brought into public notice as an orator. Tobacco was legal currency in Virginia and, according to an old statute, Episcopal clergymen received annually 16,000 pounds of tobacco for a salary. As a result, however, of the French and Indian War, the *Optional,* or *Twopence,* law was passed in 1758, allowing the salaries of the clergy to be paid in paper currency instead of tobacco, at the rate of twopence a pound. When tobacco went up to sixpence a pound the loss to the clergymen was considerable, and their protests reached the Bishop of London, through whose instrumentality the statute was vetoed by the King in council as unconstitutional. Several clergymen then sued for back pay, and in the test case of Rev. James Maury, the court decided in his favor, the damages to be settled by jury. As counsel for the defendant colony, Patrick Henry then made his eloquent speech, in which he asserted that Virginia could legislate for herself in affairs of internal concern and that by his interference the King had degenerated from a father to a tyrant. Despite cries of "Treason!" the court awarded one penny in damages.

**Parthenon,** *Pahr' the non,* **The.** See ATHENS, subhead *Age of Pericles.*

**Part'nership,** an association or firm voluntarily formed, but not incorporated, by two or more competent persons to establish and carry on for profit any business or trade not unlawful. Between partners a contract exists by implication, oral agreement or in written form; and this may be for an indefinite or for a limited period. It may be terminated by mutual consent or by one member, even against the wish of the others, in which case he becomes liable for such damages as may be awarded for his breach of contract; or its dissolution may be ordered by a court under certain conditions. One is a nominal partner who allows his name to be used, though not sharing in the firm's profits; a silent partner, if his interest in the firm is kept secret and he takes no active part in its management; while the real, ostensible or active partner is one who participates in promoting the business. Under the statutes of some states, limited partnerships may be organized (See JOINT-STOCK COMPANY). In partnerships each member is a general agent for the firm, and may bind his partners for the fulfillment of obligations, sell firm property and collect debts due to the firm. See CORPORATION; CONTRACT; AGENT.